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# Assessment of Development and Production Potential of Federal Coal Leases. Volume II Working Papers. Part 1, Vol. 1. Analysis of Federal Coal Leases in Mine Plans in Colorado, New Mexico, Oklahoma, and Utah

Dames and Moore, Denver, CO

Prepared for

Office of Technology Assessment, Washington, DC

Jun 84

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# An Assessment of
# Development and Production Potential of Federal Coal Leases

## Volume II—Working Papers

### Part I:— Vol. I: Analysis of Federal Coal Leases in Mine Plans in Colorado, New Mexico, Oklahoma, and Utah

This is an OTA Working Paper that has neither been reviewed nor approved by the Technology Assessment Board

June 1984

CONGRESS OF THE UNITED STATES
Office of Technology Assessment
Washington, D.C. 20510

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# Development and Production Potential of Federal Coal Leases

## Volume II—Working Papers

## Part I:— Vol. I: Analysis of Federal Coal Leases in Mine Plans in Colorado, New Mexico, Oklahoma, and Utah

This report is an OTA Working Paper, which was used in the preparation of OTA's final assessment report. OTA makes these working papers available for the use of readers desiring a more detailed or technical discussion of a subject than can normally be accommodated in our final report. As an OTA Working Paper, this report has not been reviewed or approved by the Technology Assessment Board. The findings and opinions expressed in this report are those of the authors and do not necessarily reflect the views of OTA, the coal leasing project advisory panel, or the Technology Assessment Board.

June 1984

CONGRESS OF THE UNITED STATES
Office of Technology Assessment
Washington, D.C. 20510

# Preface

This volume contains papers written for OTA to assist in preparation of the report *An Assessment of Development and Production Potential of Federal Coal Leases.* OTA does not endorse these papers. In several instances, the OTA report reaches somewhat different conclusions because of additional information which was obtained later. These papers, however, may prove valuable for readers needing more detailed or specific information that could be accommodated in the final assessment report, and are being made available for such purposes.

OTA WORKING PAPER I

# ANALYSIS OF FEDERAL COAL LEASES

# IN MINE PLANS

# IN COLORADO, NEW MEXICO, OKLAHOMA AND UTAH

DECEMBER 1980

Prepared by:

DAMES & MOORE

DENVER, COLORADO

CONGRESS OF THE UNITED STATES

OFFICE OF TECHNOLOGY ASSESSMENT

WASHINGTON, D.C. 20510

## OTA WORKING PAPER

This report is an OTA Working Paper, which was used in the preparation of OTA's final assessment report. OTA makes these working papers available for the use of readers desiring a more detailed or technical discussion of a subject than can normally be accomodated in our final report. As an OTA Working Paper, this report has not been reviewed or approved by the Technology Assessment Board. The findings and conclusions expressed in this report are those of the authors and do not necessarily reflect the views of OTA, the coal leasing project advisory panel, or the Technology Assessment Board.

# FOREWORD

This report was prepared for the Office of Technology Assessment by Dames and Moore of Denver Colorado. The report provides an analysis of the production potential of federal coal leases in 4 western states, Colorado, New Mexico, Oklahoma, and Utah. Primary emphasis is given to the coal leases in the Rocky Mountain States. This report was used by OTA in the preparation of its report, An Assessment of the Development and Production Potential of Federal Coal Leases.

Under contract to OTA, Dames and Moore reviewed all mining plans for federal coal leases that were filed with the U.S. Office of Surface Mining in Denver Colorado on or before September 30, 1980. (Mining plans must be filed for all operating mines and all proposed mines.) Dames and Moore prepared a summary of each mining plan and analyzed whether the mine could support the proposed production levels in the mine plan and identified any geological, engineering, environmental or transportation problems that might affect the mine's development or production rate. Additionally, the report includes an analysis of whether each mine's production rate would be sufficient to meet the requirement that Federal lessees produce 2.5 % of the lease reserves by June 1, 1986, or with an extension, by 1991. Dames and Moore also prepared an analysis of the development and production potential for certain undeveloped Federal leases for which no mining plans had been submitted. The undeveloped leases to be analyzed were selected by OTA.

This report consists of two parts. Part I is a summary of the report's methodology and conclusions and tabular summaries of information on each mining plan and lease block. Part II contains the detailed mine plan and lease block summaries. Information on active and proposed mines came from the actual mining plans prepared by the mine operators and filed with the Office of Surface Mining, from published environmental impact statements, and from comments submitted by the operators after reviewing the draft summaries. Information on undeveloped leases came from published materials, from OTA state task force reports and from sources in the Bureau of Land Management and the U.S. Geological Survey. This report contains no confidential information.

The major contributors to this report from Dames and Moore were Lawrence E. Wellborn and David Huttenlock. Karen Larsen of OTA was the contract supervisor.

This report is an OTA working paper which was used in the preparation of OTA's assessment report. Unlike OTA's final report, this working paper has not been reveiwed or approved by the Technology Assessment Board. All conclusions and opinions in this report are those of the authors and do not necessarily reflect the views of OTA, the project advisory panel, or the Technology Assesement Board.

OTA WORKING PAPER I

PART I

SUMMARY

DECEMBER, 1980

# ANALYSIS OF FEDERAL COAL LEASES
# IN MINE PLANS

SUBMITTED TO THE
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WASHINGTON, D.C.

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Dames & Moore

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# 1.0 GENERAL INTRODUCTION

## 1.1 Purpose and Scope of Analysis

The purpose of the analysis conducted as a part of this study is to assess the current status of the Federal coal leasing program in the states of Colorado, New Mexico, Utah and Oklahoma. This assessment includes both an analysis of the current development and production status of lease blocks with approved mine plans and an analysis of the potential for development and production from undeveloped lease blocks without an approved mine plan.

The status of leases examined in this report is summarized in Table 1. The total number of individual leases that were examined in the four states was 405. These 405 leases have been grouped into 163 lease blocks for the purpose of the analysis. A lease block is defined as a contiguous group of one or more leases that have a single lease holder or a group of lease holders that have indicated that they are acting jointly in the development of the lease block.

Mine plans have been submitted for 61 of the 163 lease blocks evaluated in the study. Thirty-eight of the 61 mine plans submitted have been approved. Development or production activities are in progress on all of the lease blocks with approved mine plans.

## 1.2 Overview of Production and Development Potential of the Lease Blocks

The results of the analysis show that virtually all of the lease blocks have a potential for development. Only five of the 163 lease blocks were assessed to be not capable of production of 2 1/2 percent of their

# TABLE 1

# STATUS OF LEASES EXAMINED IN THIS REPORT

(All tonnages are in $10^6$ units)

| STATE/REGION | NUMBER OF FEDERAL LEASES | TOTAL ACRES | TOTAL RECOVERABLE RESERVES | NUMBER OF FED. LEASES IN MINE PLANS | NUMBER OF MINE PLANS | MINE PLAN ACRES | | MINE PLAN RESERVES | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | TOTAL | TOTAL FED. | TOTAL | TOTAL FED. |
| COLORADO | | | | | | | | | |
| Green River | 56 | 53,312.06 | 1,660.0 | 31 | 12 | 42,679.76 | 28,442.27 | 446.7445 | |
| San Juan River | 1 | 160.0 | | 1 | 1 | 160 | 160 | 0.7 | 0.7 |
| Uinta | 63 | 69,775.08 | | 40 | 16 | 63,247.54 | 50,925.32 | 630.767 | |
| Denver-Raton Mesa | 6 | 3,685.6 | | 0 | 0 | | | | |
| UTAH | | | | | | | | | |
| Uinta | 203 | 277,230.7 | 3,188.0 | 128 | 25 | 234,068.02 | 172,28[illegible].53 | 1,864.685 | |
| NEW MEXICO | | | | | | | | | |
| San Juan River | 26 | 44,560.27 | 313.0 | 17 | 6 | 43,682.62 | 38,074.47 | 647.8112 | |
| Denver-Raton Mesa | 3 | 200.7 | | 0 | 0 | | | | |
| OKLAHOMA | | | | | | | | | |
| Western Interior | 47 | 74,270.0[illegible] | 236.0 | 7 | 5 | | 9,206.45 | | |

recoverable reserves by 1991. An additional 10 of the lease blocks were assessed to be not capable of producing 2 1/2 percent of their recoverable reserves by 1986 but capable of producing this 2 1/2 percent by 1991.

The results of the analysis also indicate that the operators of lease blocks with approved mining plans are moving quickly to develop or expand their production rates as provided for in the approved mining plans. Table 2 shows the projected increase in production form 1979 to 1990 for those properties which have approved mining plans. It is apparent from the study that the majority of the lease holders are trying to comply with the diligence requirements.

The only lease blocks which were assessed to be not capable of production by 1991 for reasons other than the quantity and the quality of the reserves are those lease blocks which are impacted by the current concern over preservation of the environment in the vicinity of Zion National Park and Bryce Canyon National Park in south central Utah. A conclusion of the study was that mining activity in this region will be barred for the foreseeable future.

# TABLE 2

# PRODUCTION FOR EACH STATE : 1979-1985-1990

(All tonnages are in $10^6$ units)

B

| STATE/REGION | 1979 ACTUAL PRODUCTION | NUMBER OF PRODUCING LEASES IN MINE PLAN | PRODUCING MINES | 1985 PLANNED PRODUCTION | NUMBER OF LEASES IN PRODUCING MINE PLANS | PRODUCING MINES | 1990 PLANNED PRODUCTION | NUMBER OF LEASES IN PRODUCING MINE PLANS | PRODUCING MINES |
|---|---|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | | | |
| Green River | 11.154 | 11 | 8 | 20.74 | | 11 | 20.736 | | 9 |
| San Juan River | 0.83 | 1 | 1 | 0.65 | | - | - | | |
| Uinta | 4.726 | 12 | 8 | 9.481 | | 11 | 14.973 | | 14 |
| UTAH | | | | | | | | | |
| Uinta | 10.3495 | 24 | 11 | 24.916 | | 20 | 36.031 | | 20 |
| NEW MEXICO | | | | | | | | | |
| San Juan River | 8.366 | 4 | 2 | 12.816 | | 4 | 14.5 | | 4 |
| OKLAHOMA | | | | | | | | | |
| Western Interior | .324 | 4 | 4 | | | | | | |

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## 2.0 METHODOLOGY

The most important consideration during the analysis of the mining plans and the undeveloped lease blocks was the quality of the information that is available. In a traditional mine feasibility study one of the required tasks is a field visit to the property being analyzed to gather data for the analysis. This initial visit may be supplemented by one or more follow up visits to fill in holes in the initial data gathering effort. Because of the large numbers of mining properties and lease blocks that had to be analyzed for this study, data gathering based upon a complete set of field visits was not a feasible approach.

The selected alternative to actual field visits for data gathering was to draw upon all other available sources of data. These sources included the mining plans filed by the mining companies, information published in mining industry journals, personal communication, environmental impact statements, and miscellaneous other sources such as the Keystone Coal Industry Manual. Because the data gathered from this collection of sources varied considerably in its completeness, the following data analysis often had to be somewhat deductive in nature. To enable the reader to better understand this trade off between data availability and the forms of the analysis, each of these aspects is discussed in more detail in the following pages.

### 2.1 Data Sources

All of the data gathering for the study was done by mineral industry professionals. These included mining engineers, geologists, and mineral economists. In each case, the professional selected to do the data gathering was the one with the professional background most appropriate to the data being gathered.

### 2.1.1 Mining Plans

Mining plans submitted by the coal mining companies and the coal developers are maintained for public access by the Office of Surface Mining (OSM). In general, the files maintained by OSM are quite complete. The exceptions to this were those cases where the mining plan and related documents had been maintained on file by the U. S. Geologic Survey (USGS). Because OSM is a relatively new agency, not all of these files have been transferred from the USGS to OSM.

The quality and the completeness of the information included in the mining plans vares with the company submitting the plan. At one end of the spectrum are the companies which have made a sincere effort to include as much data and engineering analysis on the proposed operation as was possible. In these cases, there is a clear presentation of the reserves assessment, the design of the mining plan and the selection of equipment, the scheduling of coal production over the planned life of the mine, and the discussion of related concerns such as the potential impact of the proposed operation on the environment and the transportation of the coal to identified markets.

At the other end of the spectrum were the companies which provided an absolute minimum of information in the above areas. In these cases, it was not unusual to see file copies of significant amounts of correspondence between the company and the USGS or OSM as these agencies had to go back to the company again and again to obtain information that was pertinent to the approval of the mining plan.

### 2.1.2 Industry Journals

An important source of information is the articles in mining industry journals which have been authored by the editorial staffs of these journals or have been submitted for publication by members of the industry. These articles include large amounts of property - specific information that was useful in either confirming information that was already available in the mining plan or in supplementing or updating mine plan information. This question as to the vintage of available information is a very important one. It should be noted that a number of the mining plans submitted to the Federal government were submitted as much as five years ago. As economic and market conditions have changed, so has the company's approach to the mining of a particular property. These changes are often reflected in supplementary information submitted to OSM or the USGS but not always.

### 2.1.3Environmental Impact Statements

Environmental Impact Statements (EIS) prepared for coal resource development have been prepared on a regional basis. An EIS is generally organized to address those coal properties that are pending development at the time the EIS is prepared. The property-specific analysis included in an EIS is often quite thorough. A property will be described in as much detail as is included in a well written mining plan. Unfortunately, many of the mining plans and undeveloped lease blocks analyzed in this study have never been included in a regional EIS.

The EIS can still be of some value as a data source for the analysis of the properties that were not specifically addressed in the FIS. This usefulness arises from the fact that an EIS contains some of the best information on regional environmental conditions and transportation systems that is available.

### 2.1.4 Keystone Coal Industry Manual

The Keystone Coal Industry Manual is a massive compendium of information in the U.S. coal industry. Unfortunately, much of the information is too general or not appropriate for this particular study. One feature of the Keystone Manual that was useful was the discussion of coal geology for the various coal producing states included in the study.

A definite deficiency of the Keystone Manual is the amount of out-of-date information that it contains. This is particularly true of the company-specific information. Production data and other statistics on the coal producers generally seems to be two to three years old even though the Manual is published annually.

## 2.2 Organization of Analysis

The analysis of the information gathered on the mining plans and the undeveloped lease blocks was organized around industry-accepted engineering and analytical techniques. All of the parameters reported in the available information were analytically evaluated and duplicate calculations were performed where indicated. Parameters that were evaluated in the study included coal reserves, recovery ratios, stripping, annual production rates, and production schedule over the life of a mine. The methods used to perform each of these assessments are discussed below.

### 2.2.1 Coal Reserves

The coal reserves reported for each of the mining plans and the undeveloped lease blocks were recalculated with as much precision as the available data would allow. Factors considered in these calculations included seam thickness, acreage available for mining, identified pinching of seams, and the presence of geologic features such as fault zones that would render coal unminable.

As has already been indicated, the information available to perform coal reserve calculations varied considerably. In those cases where there was plentiful information, the attempt was to complete the entire reserve computation procedure. If this recalculation produced a number that was significantly at variance with the reported number, then this variance was reported in the write-up for the property.

In those cases where there was insufficient information to allow for complete calculation of a reserve figure, the approoach used was to attempt to justify the reported number. If the various calculated checks on the reported number indicated a number that approximated that reported, then the reported number was assumed to be correct. If not, the discrepancy was reported in the property-specific write-up.

### 2.2.2 Recovery Ratios

The percentage of coal recovered from a given property is of considerable importance. Most importantly, it is a measure of how much of the coal resource in the ground is being recovered. The mining company should be concerned with the recovery ratio because the higher it is the more coal the company will be able to produce to make a profit.

Unfortunately, some companies will go after the more easily mined coal and not attempt to maximize the recovery ratio.

Without having access to significantly more information than was available for this study, especially field visits, it is very difficult to determine whether a lower recovery ratio indicates a company that is going after the more easily mined and cheaper coal or a company that has real mining problems that prevent the attainment of a higher recovery ratio.

Mining method used will be of the most importance in determining the final recovery ratio. Surface mining methods will generally produce coal recoveries in the range of 90 to 95 percent. For the underground methods, longwall mining is generally considered to have the highest recovery rate. Overall recovery rates for longwall are typically 70 to 80 percent but can exceed 80 percent if conditions are right. The other principal underground mining technique, room and pillar, is typified by a recovery rate of 50 percent. However, the actual recovery ratio attained for room and pillar can vary significantly both upwards and downwards from the often quoted median of 50 percent.

Other than mining method, the factors which will have the greatest impact on recovery ratio include seam thickness, the number of seams, distance between seams, the amount of overburden for surface mines or the depth of cover for underground mines, the dip of the seams, and a range of geotechnical conditions. The approach used in this study was to look for any of the above-listed factors that would indicate that a property should have a recovery ratio higher or lower than the norm that would be expected for the mining method in use. For all, except about 10 percent, of the mining plans and the undeveloped lease blocks evaluated, the recovery ratio reported seemed reasonable. In the remaining cases, the possibility of a recovery ratio being too high or too low was indicated and the reasons for this conclusion were documented in the property-specific write-up.

### 2.2.3 Stripping Ratios

Stripping ratios pertain only to surface mining operations. Basically defined, the stripping ratio is the ratio of the cubic yards of overburden that must be removed to mine a ton of coal. The calculation of the stripping ratio becomes more complex for multiple-seam mines where the amount of interburden between seams must be factored into the calculation. However, the basic definition remains the same as for single-seam mines.

The stripping ratio is the single most important economic parameter for a surface operation. The lower the stripping ratio, the less expense that must be dedicated to removal and replacement of overburden per unit of coal. A general rule of thumb is that a 10 to 1 stripping ratio is the economic limit for a mine. However, that rule must be further qualified by the seam thickness, the number of seams, and the difficulty of removing the overburden. For example, it is one thing to discuss the removal of 20 feet of overburden to mine a 3-foot thick seam of coal and quite another to talk about the removal of 660 feet of overburden to mine 100 feet of coal. Yet, both these examples have approximately a 6.6 to 1 stripping ratio.

### 2.2.4 Annual Production Rate

The calculation of annual production rate is different for surface and underground mining operations. The primary determinant of annual production capacity ofr surface operation is the capacity of the overburden removal equipment. Whether overburden removal is done by dragline, by truck and shovel or by scraper, each piece of equipment will have a certain materials handling capability given the site-specific condition at a mine. By determining the collective capaciy of the overburden removal equipment, both to excavate the overburden material and to move it to its final point of deposition, it is possible to estimate the amount of coal which can be uncovered in a year's time. It is then a matter of ensuring that sufficient coal loading and haulage equipment is on site to mine the coal and move it to the tipple.

For underground coal mining, the primary concern is to have enough development workings to provide access to the coal for the coal mining equipment. Depending upon the mining system used, this access will consist of drifts and entries. The size of the drifts and the number of entries will generally depend upon the planned production rate for the mine. Although a portion of the annual coal production from a mine will be provided by the development of the entries, the major portion of the production will come from panels where development has been completed and full-scale mining operations are in progress.

Once the development workings are in place, the annual production rate will be determined by the combined capacity of the coal mining equipment and of the transportation system for moving the coal out of the mine. Rated capacities of mining equipment will vary with seam thickness and a number of other mine conditions. Typical rates for continuous miners are in the range of 400 to 700 tons of coal per shift and longwall units 1,000 to 2,000 tons per shift. In-mine transportation facilities will usually consist of shuttle cars to move the coal from continuous miners, if they are in use, to conveyors located in the main entries. Otherwise, the conveyors will be extended directly to receive the coal production from the continuous miner or the face conveyor on the longwall unit. The total number of conveyors and their sizes will depend upon the planned production rate for the mine and the number of production units.

### 2.2.5 Production Scheduling

Production scheduling in most mines is based on the selection of an annual production rate that will satisfy identified or potential markets and then continuing to produce at that rate each year until the reserves are mined out. Most mines are designed for a minimum life of 10 to 15 years and maximum lives of 30 to 40 years. The minimum life is usually based on the financial consideration of remaining in operation long enough to fully amortize and extract maximum use from expensive mining or stripping equipment. The maximum life will tend to be a function of the available market for the coal. If a company does not have sufficient markets but does have large coal reserves to produce from, then it will plan for a lower annual production rate and a correspondingly longer life.

The actual production schedule implemented for the life of the mine will depend upon a number of factors other than those discussed above. In surface coal mining, the stripping ratio will usually vary from year to year. This variation in stripping ratio can result from a dippng seam relative to the overlying surface so that the stripping ratio continues to increase each year until it becomes no longer economic to mine. Similarly, the depth of overburden can vary up and down because of undulating hills on the surface. All of these factors must be taken into account during the mine planning process and stripping and mining schedules assigned to equipment so that the two operations remain in balance over the life of the mine. It may be necessary to add or delete equipment during the life of the mine if there is no other way to keep the overburden removal and coal mining functions balanced.

Similar problems exist for under ground mining. Here they will be attributable to factors such as variation in seam thickness, the pinching out of seams or the interruption of mining operations because of rock dikes or fault zones that are encountered. If potential conditions such as these have been picked up by exploration drilling and can be planned for in advance, then their impact on mining operations will be much less. Interruptions in the mining operations which can routinely be planned for include extention of the haulage system or movement of mining equipment to a new panel. For example, a longwall operation may be down as much as 30 days while the equipment is moved from the old depleted panel to a new one where development workings have already been completed and are ready for installation of the equipment.

All of the above factors must be planned for on a continuing basis. Unless mining conditions are ideal, there will always be information becoming available which will modify previous planning. Hence, the production scheduling projected over the lives of the mines in the mining plans represent little more than best guesses in most cases.

### 2.2 Accuracy of the Analysis

The point has already been made that the analyses of the mining plans and the undeveloped lease blocks are only as good as the data which was available. With limited exception, the approved mining plans and on-going operations were the most complete. However, data availability for some of the properties in this category, especially the smaller operations, was also rather poor.

Because the data was usually available, the analysis of approved mining plans was generally done in accordance with the criteria discussed in the preceding section. In some cases it was necessary to use short cuts simply because adequate information was not available. Where this was done is indicated in the property-specific write-ups.

Analysis of undeveloped lease blocks which had been previously evaluated by the state task forces was particularly impacted by the lack of data. The best that could be done in most cases was to attribute known regional characteristics to these lease blocks. In those limited cases where an undeveloped lease block was located adjacent to an operation mine with an approved mining plan, then there was considerable additional insight as to the conditions which might prevail on the lease block.

## 3.0 SUMMARY OF DEVELOPMENT AND PRODUCTION POTENTIAL OF FEDERAL COAL LEASES

This chapter discusses the results of the analysis of leases with approved mine plans and certain lease blocks specified by OTA, using the engineering and economic criteria discussed in Chapter 2 as a basis for the analysis. The results are presented both as tabular summaries and as a discussion of significant issues which affect the development and production potential of Federal coal leases.

### 3.1 Analysis of Mine Plans and Active Mines

There are 38 lease blocks in the states of Colorado, Utah, New Mexico and Oklahoma which have approved mine plans. Salient statistics of these mine plans and the active mines which are already in existence are summarized in Appendix 1 and described in Volume II. The mining operations for these approved mine plans vary significantly in size. Total acreage included in a mine plan varies from as little as 80 acres for the Ohio Creek #2 mine in Colorado to as much as the 20,325.93 acres included in the mine plan for Braztah mines numbers 3,5, 6 and 7. Total acreage is not necessarily an accurate measure of the production capability of an existing or planned mining operation nor of the role of Federal lands in the mine plan. All of the 80 acres included in the Ohio Creek #2 mine are Federal lease acres whereas only a little more than half, 11,525.93 out of 20,325.93 acres, of the mine plan area for the Braztah mines is made up of Federal acreage.

The rated production capacities for the planned and existing mine operations with approved mine plans does tend to correlate with the physical sizze of the mine plan area. Again, Ohio Creek #2 is the smallest with a rated annual coal production capacity of 12,000 tons and Braztsh is the largest with an annual capacity of 6.5 million tons. However, there are some notable exceptions to this rule. The Eagle Number 5 and 9 mines of Empire Energy Company in Colorado have an approved mine plan area of 500.75 acres and a rated annual capacity of three million tons whereas another Colorado operation, the Edna mine of Gulf Oil Corporation, has an approved mine plan area of 4,476 acres and a rated annual capacity of 1.1 million tons of coal.

Another area of significant variance is the planned mine life. The Eagle Number 5 and 9 mines, one of the larger mining units as indicated above, with a planned remaining life of five years, clearly contrasts with the Hiawatha mine of the United States Fuel Company in Utah with an identical annual capacity of three million tons and an estimated remaining life of 35 years.

Underground mining methods clearly predominate in the four study states. Only twelve of the mining operations for the approved mine plans are designed for surface recovery of the coal. Nowhere is this more true than in the State of Utah where there is not a single surface mine on Federal lands. In New Mexico, the reverse is true. There are only two approved mine plans for this state and both of them are surface mining operations. In Colorado, the underground operations form a clear majority. However, the northwest portion of Colorado, primarily Moffat and Roult Counties, has only two underground mines out of a total of ten that are currently approved for operation.

The comparisons which have been made thus far are only the ones which can be drawn from the mass of detail that accompanies each of the mine plans. Comparisons of a less quantifiable nature will be discussed in some of the remaining sections of this chapter. The reader is referred to the narrative discussions included in Volume II for each of the approved mine plans for a more complete understanding of how the plans differ.

## 3.2 Analysis of Undeveloped Leases

Comparisons similar to those for the approved mine plans can be drawn for the undeveloped lease blocks. In terms of total lease acreage, there is even a more profound variation in size. The smallest of the undeveloped lease blocks is the proposed Johnnies mine of the Prosper Lombardi venture with 80 acres, all of which is Federal acreage. The largest of the undeveloped lease blocks is the proposed Kaiparowits Number 1 through 5 mines of Mono Power Company, et al., with 47,767.79 acres. Of the total acreage for this latter lease block, 40,277.35 is Federal.

Other than total physical size, it is more difficult to quantitatively compare the undeveloped lease blocks than was the case with the approved mining plans because less is known concerning the lease holders' intentions for the undeveloped lease blocks. Of the identified 123 undeveloped lease blocks in Colorado, Utah, New Mexico and Oklahoma, proposed mine plans have been submitted for 25. A mine plan is the only clear indication of what the lease holder intends to do with the lease block.

Evaluation of the 25 mine plans that have been submitted for undeveloped lease blocks reveals the following comparisons. As was true in the case of approved mine plans, the lease blocks that are physically smallest and largest in terms of total acreage also have the smallest and largest proposed annual production rates. The Johnnies mine has a proposed production rate of 10,000 tons per year, less than the 12,000 tons per year for the smallest approved mining plan, and the Kaiparowits mines have a proposed annual production rate of 12 million tons, nearly twice as large as the 6.5 million-ton annual rate for the approved Braztah mines.

The mine lives proposed for the undeveloped lease blocks are uniformly longer than those for the approved mine plans. The minimum proposed life is 10 years. Six of the 25 submitted mine plans have proposed the minimum. Twelve of the proposed lives are for 30 or more years and three are for 40 or more years. The longest proposed life is 45 years for the Skumpah lease block of Energy Reserves in Utah. One obvious reason for the undeveloped lease blocks having longer lives than the approved mine plans is because the latter group includes mines which are at varying stages in their lives. Some have not yet begun development or are in the development process and the remainder have produced varying percentages of their original recoverable reserves.

As in the case of the lease blocks with approved mine plans, the undeveloped lease block narratives included in Volume II provide considerable additional detail which cannot be readily quantified. Narratives have not been prepared for all of the undeveloped lease blocks, but only for 37 which have been designated for additional analysis by OTA.

### 3.3 Assessment of Due Diligence Requirements

Data which indicates the ability of the lease holders to comply with the requirements for diligent development and continuous operation for the lease blocks is presented in Appendices 2 through 4.

Appendix 2 summarizes the results of a number of questions that were applied to the lease blocks as they were analyzed for their development and production potential. The initial question was to whether the lease block constituted a logical mining unit in itself. Of the 61 mining plans that are summarized in this appendix, 19 are for lease blocks which are considered to represent logical mining units in themselves. For the remaining 42 mine plans, 22 require additional reserves to form a logical mining unit and 20 require additional leases.

On the question as to whether the lease block will have 2 1/2 percent of its reserves produced by 1986, only 15 of the 61 mining plans failed this test. Of that 15, 10 were assessed to be capable of reaching the 2 1/2 percent requirement by 1991 and the remaining five were assessed to be not capable of meeting this requirement.

Evaluation of the 56 lease blocks which were assessed to be capable of producing 2 1/2 percent or more of their reserves by 1991 showed seven of these 56 which would not be able to produce all of their recoverable reserves in 40 years. Of this total of seven, three are currently producing mines.

Of the five lease blocks which were assessed to be not capable of producing 2 1/2 percent of their reserves by 1981 only one, the Cottonwood Creek property of Mid-Continent Resources, was evaluated to be capable of annually producing 1 percent of its recoverable reserves by that year.

Appendix 3, Tablular Summary of Production Potential by Lease Block, and Appendix 4, Tabular Summary of Annual Production by Lease Block:

1980-1990, present the backup data for the responses to the due diligence questions that were discussed above and are summarized in Appendix 2.

### 3.4 Discussion of Significant Issues

There are a number of factors which can have a significant impact on the probability of a particular lease block becoming a successful mine. Several of these factors were presented in Chapter 2 as a part of the discussion of technical criteria that were used in the analysis of the lease blocks. The importance of these factors will become more apparent now when they are discussed in terms of case examples of the development and production potential of lease blocks. Backup data for this discussion can be found in Appendix 5, Tabular Summary of Mining and Reclamation Problems, and in the narrative discussion of the lease blocks included in Volume II.

#### 3.4.1 Dipping Seams

In general, the coal seams located on the lease blocks considered in this study are relatively flat lying. Flat lying is defined here to include seams with a dip of 5 degrees or less.

The most extreme seam dip of any of the lease blocks analyzed is that found in the proposed Snowmass mine in Colorado. In this mine, the seam dips 30 degrees. Not only is this amount of dip too great for normal mining operations, it is also approaching the angle of repose for unconsolidated material. Snowmass' answer to the problem was to devise a modified longwall method which will be implemented with the long axis of the longwall panels parallel to the strike of the coal seams. As a realt, the headgate and tailgate entries can be developed so that they are essentially horizontal. The longwall face will extend downdip at an angle equal to the dip of the seam. The face supports are set into steps that run the length of the face.

The importance of this innovation is revealed in the fact that the Snowmass mine has been shut down since 1966 when mining conditions became too severe for the mining method in use at that time. The technological improvements that support the new mining method have only come on the market in recent years. Without this new technology, the 42.5 million tons of recoverable reserves available at Snowmass would have gone unrecovered.

### 3.4.2 Ground Support

Ground support difficulties in an underground mine derive primarily from one or both of two conditions, excessive depths of cover and poor roof or floor rock. If the basis of the problem is excessive depth of cover, there is little to be done except increasing the size of the pillars that must carry the weight of the overlying rock strata. This solution has a direct impact on the recovery ratio that can be expected for a property. An alternative solution, if mining conditions allow, is to convert the mine to a longwall operation. In this approach, there is no longer an attempt to keep the mine panels open but instead they are encouraged to cave after the coal has been extracted.

In the case of poor roof or floor conditions, there is an economic and technical limit to the amount of effort that can be put into keeping mine development workings or mining panels open until the coal can be recovered. In the Somerset mine of U.S. Steel, mine personnel continued to try different solutions for maintaining access to the B seam. It finally came to the point that they had to pull out and let the development entries cave.

Ground support problems are one of the principal reasons given for the possible non-development of the U.S. Steel leases in the Coal Basin Field of Colorado. Mid-Continent Coal & Coke has been able to continue to successfully operate in this field, but only through considerable additional efforts.

### 3.4.3 Environmental Constraints

In general, environmental constraints are not a major problem with mine devleopment in Colorado, Utah, New Mexico and Oklahoma. Because of the higher proportion of underground mines, it is possible to develop and operate the mines with a minimum of impact on the surface environment. Even in northwestern Colorado, where surface mines predominate, it has been possible to implement reclamation practices which will return the land to a condition which is equal or better than its pre-mining condition.

There are two areas in the four states where concern over the imapct of mining on the environment may curtail or eliminate coal mining. In Star Lake-Bisti region of New Mexico the concern is over the ability of the mining companies to revegetatew the land after it has been reclaimed. Another concern is the potential impact of surface mining operations on the Chaco National Monument and other scenic wonders in the area. At this time, it appears that both of these concerns will be resolved and that mining operations will be allowed to proceed.

The issues surrounding the proposed mining of lease blocks in the Alton and Kaiparowits Coal Fields of southern Utah are much more strongly developed. The environmental groups have formed a coalition that is absolutely opposed to the development of surface or subsurface mining operations in this region because of their potential impact on Zion National Park and Bryce Canyon National Park. Both the National Park Service and the Environmental Protection Agency have publicly announced that they will fight against mine development in this region. It would appear that these lease blocks will not be developed at any time in the near future or ever.

### 3.4.4 Transportation

Because of the distance between the mines and the markets, most western coal mines require ready access to rail transportation or some comparable mass transportation technique such as slurry pipelining. With two notable exceptions, all of the principal coal mining regions in the four study states have reasonable access to the required rail transportation at this time.

The Book Cliffs Field of central Utah has been served by the Denver & Rio Grande Western Railroad for some time. The problem is that the routes the railroad travels to the major coal markets are so circuitous that it places a real economic penalty on the mines in this area and their ability to compete in markets outside of Utah. The problem is further magnified when major coal producers like the Convulsion Canyon mine of Coastal States Energy must haul its coal 70 miles one way by truck to reach the nearest railhead. If mining conditions were not so ideal at Convulsion Canyon, it is quite possible that the property would not be economic.

The absence of a rail link into the Star Lake-Bisti region of New Mexico is a major deterrent to the development of the lease blocks located there. The principal obstacle at this time is resolution of Indian land-use claims. It is safe to say that these lease blocks will not be developed into mines until the construction of the rail link is approved.

### 3.4.5 Market Constraints

The principal advantage of most of the coals produced in Colorado, Utah and Oklahoma is their high quality, a combination of high BTU content and low sulfur content. New Mexico coals have the low sulfur but their BTU content is in the range of 8,000 to 9,000 BTU's per pound as compared to the 11,000 to 13,000 range that is typical of the other three states. This higher quality means that the coals can be shipped longer distances at higher cost and still find a market.

Although the steam coal market is definitely softer than it has been, there seems to be a continuing market for high quality steam coals. Coals produced from lease blocks proposed for development will go to a combination of local power plants as well as the more distant power plants of the Midwest. The market for metallurgical coal is currently quite depressed and is likely to remain so for some time. There is still no clear indication as to when the domestic steel industry will regain its strength. Even when it does, the continuing inroads being made by imported coke will dampen the demand for domestically produced coke. Proposed mining operations such as Snowmass have exported bulk samples to the Far East in an attempt to open markets there. However, they are competing head on with increased export drives by Australia, Canada and South Africa.

# APPENDIX 1

## Tabular Summary:
## Mine Plans and Lease Blocks

## KEY SHEET

Mine Type

| | |
|---|---|
| S- | Surface |
| UG- | Underground |
| Both- | Surface and Underground |

Mine Status

| | |
|---|---|
| A- | Approved Mine Plan - Operating |
| S- | Submitted Mine Plan - Pending |
| I.M.P.- | Incomplete Mine Plan |
| - | No Mine Plan |

Source

| | |
|---|---|
| M.P.- | Mine Plan |
| I.C.- | Independent Contractor |
| O.S.- | Open Source |

*Note:

A set of parentheses is used when a lease is counted in another mine plan, several mines jointly mine the same lease.

# KEY SHEET FOR TABLES

Equipment

| | |
|---|---|
| A- | Auger |
| B.H.- | Backhoe |
| C.M.- | Continuous Miner |
| Conv.- | Conventional Miner (Cut and Blast) |
| D.- | Dozer |
| D.L.- | Drag Line |
| FEL- | Front-end Loader |
| L.W.- | Longwall |
| S.C.- | Shuttle Car |
| S.P.- | Slurry Pipeline |
| S.W.- | Short Wall |
| T- | Truck Haul |
| T&S- | Truck and Shovel |
| W.S.- | Wheeled Scraper |

Mining Methods

| | |
|---|---|
| U.G.- | Underground |
| S- | Surface |
| OP- | Open Pit |
| OPBH- | Open Pit Backhaul |
| R&P- | Room and Pillar |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MIN. TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COLORADO GREEN RIVER | | | | | | | | | | | | | | |
| CANADIAN | C27931 | Wyoming Fuel Co | JACKSON | 90 | 90 | S | A | 0.12 | 1980 | 7 | 0.048 | 0.092 | – | |
| COLOWYO | D039365 | Colowyo Coal Co | MOFFAT | 2,544.79 | 2,544.79 | S | A | 4.5 | 1971 | 26 | 1.699 | 4.5 | 4.5 | |
| EAGLE 5,9 | D056298<br>C0117865<br>C0126480 | EMPIRE ENERGY COMPANY | MOFFAT | 500.75 | 450.75 | U.G. | A | 3.0 | 1979 | 5 | 0.719 | 1.5 | – | |
| TRAPPER | C07518<br>C07519<br>C079641<br>C813 | UTAH INTERNATIONAL, INC. | MOFFAT | 8,290 | 5,450.87 | S | A | 2.8 | 1977 | 33 | 2.329 | 2.3 | 2.3 | |
| DESERADO | C025703<br>D047201 | WESTERN FUELS ASSOC. | RIO BLANCO | 3,070.22 | 3,070.22 | U.G. | S | 1.8 | 1984 | 20 | – | 0.468 | 1.356 | |
| MEEKER AREA | D044240<br>C076713<br>C1545<br>C28358<br>C28359 | NORTHERN MINERALS COMPANY | RIO BLANCO | 4,750 | 3,262.23 | U.G. | A | 4.8 | 1980 | 29 | 0.089 | 3.8 | 4.5 | |
| APEX No. 2 | C0117592<br>D046544 | SUNLAND MINING CORPORATION | ROUTT | 240 | 240 | U.G. | A | 0.1 | 1978 | 12 | | 0.1 | 0.1 | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EDNA | C021601<br>DO33327<br>DO41478 | GULF OIL CORPORATION | ROUTT | 4,476 | 1,275.98 | S | A | 1.1 | 1976 | 10 | 1.166 | 1.1 | 1.1 | |
| TROUT CREEK | DO58710<br>(C021601) | " | " | | 826.99 | U/G | I.A.P. | 0.18 | 1982 | 10 | – | 0.18 | 0.18 | |
| ENERGY 1,2 | DO52547<br>C081330<br>C16284<br>C128433<br>C20900<br>C22694 | ENERGY FUELS CORPORATION | ROUTT | 11,608 | 6,308.02 | S | A | 3.9 | 1971 | 15 | 3.433 | 3.9 | 3.9 | |
| JOHNNIES | C23376 | PROSPER LOMBARDI | ROUTT | 80.0 | 80.0 | U/G | I.A.P. | 0.01 | ? | | – | – | – | |
| SENECA 2W | C081251<br>C081258 | PEABODY COAL COMPANY | ROUTT | 7,120 | 4,842.47 | S | A | 2.5 | | 15 | 1.611 | 2.5 | 2.5 | |
| Σ 12 | 31 | | | 42,671.76 | 28,492.27 | | | | | | 11.154 | 20.74 | 20.736 | |
| OTHER | GREEN RIVER LEASES | | | | | | | | | | | | | |
| #30 | C030472 | AMCA LEASING | JACKSON | | 120.0 | U.G. | - | | | | - | - | - | |
| #31A & B | C0105299 | KEMMERER COAL | JACKSON | | 560.0 | U.G. | - | | | | - | - | - | |
| #31C | C0105300 | " | " | | 1,680.0 | BOTH | - | | | | - | - | - | |
| #31D | C0123177 | " | " | | 1,706.92 | BOTH | - | | | | - | - | - | |
| #32 | DO57166 | WYOMING FUEL | JACKSON | | 172.75 | BOTH | - | | | | - | - | - | |
| #5 | C0125957 | W.R. GRACE | MOFFAT | | 3,263.0 | U.G. | - | | | | - | - | - | |
| #3 | C0064416 | FERNE JAMES | MOFFAT | | 90.1 | U.G. | - | | | | - | - | - | |
| | C25498 | UTAH INTERNATIONAL INC. | | | 85.26 | - | - | | | | - | - | - | |

1-3

(All tonnages are in 10⁶ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # 16 | C0123976 | UTAH INTERNATIONAL | MOFFAT | | 3255.22 | U.G. | – | – | – | – | – | – | – | |
| # 19 | C028875 | RUSSELL CHAPMAN | RIO BLANCO | | 1575.22 | S | | | | 40 | | | | DESERADO |
| # 12 | C093713 | CONSOLIDATION COAL | RIO BLANCO | | 2517.98 | U.G | | | | | | | | |
| | C093716 | • | ″ | | 2060.71 | U.G. | | | | | | | | |
| # 13 | C 245 | ″ | ″ | | 225.86 | BOTH | | | | | | | | |
| # 14 | C1546 | ″ | ″ | | 1096.73 | U.G. | | | | | | | | |
| # 15 | C093713 | NORTHERN MINERAL | RIO BLANCO | | 571.5 | BOTH | | | | | | | | |
| | C093715 | NORTHERN MINERALS | RIO BLANCO | | 760.0 | U.G. | | | | | | | | |
| # 1 | D051376 | AMCA COAL LEASING | ROUTT | | 2504.1 | U.G. | | | | | | | | |
| | C22676 | ENERGY FUELS | ROUTT | | 902.29 | S | | | | | | | | |
| 12 CARDINAL | C012894 | FRANKLIN REAL ESTATE | ROUTT | | 631.42 | BOTH | | | | | | | | |
| # 10 | D052596 | SHERIDAN ENTERPRISES | ROUTT | | 160.0 | U.G. | | | | | | | | |
| # 6 | C0114093 | PEABODY COAL | ROUTT | | 1,320.0 | S | | | | | | | | SENECA |
| # 7 | C086654 | PEABODY COAL | ROUTT | | 160.0 | U.G. | | | | | | | | SENECA |
| # 8 | C088199 | PEABODY COAL | ROUTT | | 2,280.0 | BOTH | | | | | | | | SENECA |
| | C19885 | PEABODY COAL | ROUTT | | 125.16 | S. | | | | | | | | |
| # 9 SUN | D051698 | KERRY CONSTRUCTION | ROUTT | | 196.26 | U.G. | | | | | | | | |
| | 25 | | | | 24,869.79 | | | | | | | | | |

(All tonnages are in $10^6$ tons)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAN JUAN RIVER | | | | | | | | | | | | | | |
| NATIONAL KING COAL | P058300 | National King Coal | LA PLATA | 160 | 160 | U.G. | A | 0.07 | 1936 | 7 | 0.083 | 0.065 | – | |
| 1 | 1 | | | 160 | 160 | | | | | | 0.083 | 0.065 | | |
| UINTA | | | | | | | | | | | | | | |
| ORCHARD VALLEY | C25077<br>C27432 | COLORADO WESTMORELAND | DELTA | 1,284.59 | 1,164.5 | U.G. | A | 1.3 | 1976 | | 0.722 | 1.3 | 1.3 | |
| RED CANYON 2 | D036906 | GRAND MESA COAL | DELTA | 140 | 41.29 | U.G. | S | 0.4 | 1989 | 20 | – | – | 0.3 | |
| SOMERSET | D052504<br>C033301<br>C033302 | U.S. STEEL CORP. | DELTA & GUNNISON | 4,095.35 | 4,095.35 | U.G. | A | 0.94 | 1977 | 20 | 0.906 | 0.94 | 0.94 | |
| BLUE RIBBON | (C033301) | SUNFLOWER ENERGY | DELTA | 750.33 | (625.13) | U.G. | S | 0.258 | 1985 | 16 | – | 0.109 | 0.109 | |
| LOMA + McCLANE + MUNGER CANYONS | C0125936<br>C0126437<br>C0125438<br>C0125439<br>C0125515<br>C0126516 | SHERIDAN ENTERPRISES, INC. | GARFIELD | 14,929.33 | 14,929.33 | U.G. | S | 5.0 | 1982 | 30 | .003 | 2.5 | 5.0 | |
| BEAR | D044569 | ARCO | GUNNISON | (1,000.0) | (1,000.0) | U.G. | A | 0.275 | | 5 | 0.262 | – | – | |
| MT. GUNNISON | (D044569)<br>C0117192<br>C1362 | ARCO | GUNNISON | 12,578 | 7,411.61 | U.G. | S | 2.8 | 1983 | 26 | – | 0.75 | 1.98 | |
| COAL BASIN | C0116606<br>C011646<br>C0125456<br>C030345<br>C12610<br>C074632<br>C0125457<br>C09004<br>C09006 | MID-CONTINENT RESOURCES, INC. | GUNNISON & PITKIN | 11,180 | 6,990.59 | U.G. | A | 1.3 | 1976 | 20 | 0.763 | 0.85 | 0.85 | |

(All tonnages are in $10^6$ tons)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UINTA | | | | | | | | | | | | | | |
| SNOWMASS | COB172<br>COB173 | ANSCHUTZ COAL CORP. | PITKIN | 4881.95 | 4881.95 | U.G. | S | 1.0 | 1987 | 30 | - | - | 1.0 | |
| HAWKS NEST EAST & WEST | C17130<br>D056724<br>D042921<br>C27103 | WESTERN SLOPE CARBON, INC. | GUNNISON | 1,279 | 1,538.61 | U.G. | A | 1.4 | 1976 | 27 | 0.436 | 1.2 | 1.3 | |
| OHIO CREEK 2 | C069942 | HENRY WEAVER | GUNNISON | 80.0 | 80.0 | U.G. | A | 0.012 | 1976 | 24 | 0.012 | 0.012 | 0.012 | |
| WINDJAMMER | D057501 | ANCHOR COAL CO | GUNNISON | 297 | 280.0 | U.G. | I MP. | 0.12 | 1983 | 10 | – | 0.12 | 0.12 | |
| CAMEO 1&2 | C01538 | GEX COLORADO | MESA | 4814.72 | 2,560.0 | U.G | S&A | 1.488 | 1978 | 29 | 0.745 | 0.975 | 1.3 | |
| COAL CANYON | C037277<br>C059423<br>D046809 | MID-CONTINENT COAL & COKE CO | MESA | | 2,020.86 | U.G. | I M.P. | 0.5 | 1986 | 33 | – | – | 0.5 | |
| COTTONWOOD CREEK | C020740<br>C024998<br>C024889 | MID-CONTINENT RESOURCES, INC. | MESA | 5,567.33 | 5,113.29 | U.G. | I. MP. | 1.0 | 1987 | 30 | – | – | 0.267 | |
| ROADSIDE | C078049 | GEX COLORADO | MESA | 1,369.99 | 809.99 | U.G. | A | 1.24 | 1900's | 6 | .827 | 0.75 | – | |
| 16 | 40 | | | 63,247.54 | 50,925.32 | | | | | | 4.726 | 9.481 | 14.973. | |
| OTHER UINTA LEASES | | | | | | | | | | | | | | |
| #36 GREEN VALLEY | D055156 | UTAH INTERNATIONAL | DELTA | | 173.7 | U.G. | | | | | | | | |
| #20 PAONIA FARMERS | D036955 | GULF OIL CORP. | DELTA | | 280.0 | U.G. | | | | | | | | |
| #33 HARVEY GAP | D043931 | EVELYN WELCH | GARFIELD | | 120.28 | U.G. | | | | | | | | |
| # 26 | D037766 | THOMPSON CREEK | GUNNISON | | 120.0 | U.G. | | | | | | | | |
| # 28 | C030344<br>C030346<br>C0125485<br>C12638<br>C12639 | U.S. STEEL | GUNNISON | | 3,969.13 | U.G. | | | | | | | | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER UINTA LEASES | | | | | | | | | | | | | | |
| #28 CONTINUED | C1894<br>C7862<br>C7863 | U.S. STEEL CORP | GUNNISON | | | U.G. | | | | | | | | |
| #23 | C051669 | U.S. STEEL CORP | GUNNISON | | 1,092.33 | BOTH | | | | | | | | |
| #24 | C068389 | U.S. STEEL CORP | GUNNISON | | 660.0 | BOTH | | | | | | | | |
| #25 | D052558 | U.S. STEEL CORP | GUNNISON | | 213.99 | U.G. | | | | | | | | |
| #38 A | C0120073<br>C0120078<br>C0120079<br>C0120080<br>D038385<br>C0120076 | KEMMERER COAL CO | MONTROSE<br>OURAY | | 11,080.79 | U.G. | | | | | | | | |
| #38 B | C0120077 | KEMMERER COAL | OURAY | | 1,241.93 | U.G. | | | | | | | | |
| #27 | C012765 | GARLAND COAL & MIN. | PITKIN | | 997.64 | U.G. | | | | | | | | |
| | 23 | | | | 18,819.76 | | | | | | | | | |
| COLORADO DENVER - RATON MESA | | | | | | | | | | | | | | |
| #41 | C0112685<br>C0112686<br>C0112687 | PEABODY COAL | ELBERT | | 1,923.68 | S | | | | | | | | |
| #42 | C0126477 | PEABODY COAL | ELBERT | | 760.0 | S | | | | | | | | |
| #39 | POSBCA3 | ALBERT MARTINEZ | LAS ANIMAS | | 40.0 | BOTH | | | | | | | | |
| #40 MAXWELL | C067 | CF & I STEEL | LAS ANIMAS | | 961.92 | U.G. | | | | | | | | |
| | 6 | | | | 3,685.60 | | | | | | | | | |

(All tonnages are in 10$^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UTAH - UINTA | | | | | | | | | | | | | | |
| B CANYON | U068754 | U.S. STEEL CORP | CARBON | 3,921.5 | 2,570.67 | U.G. | IMP. | 1.0 | 1988 | 26 | - | – | 0.685 | |
| BRAZTAH 3,5,6,7 | U058184<br>SL071737<br>U25981<br>U35495<br>U019524<br>U0 HD179<br>U0146345<br>SL044652<br>SL048441<br>SL029093 | FRANKLIN REAL ESTATE COMPANY | CARBON | 20,325.93 | 11,525.93 | U.G. | A | 6.5 | 1975 | 20 | 0.733 | 3.0 | 6.1 | |
| C AND W No. 1 | SL063011 | WASATCH COAL | CARBON | 200.0 | 280.0 | U.G. | I.M.P. | 0.222 | 1987 | 10 | - | – | 0.2 | |
| PINNACLE (DEADMAN CANY) | SL027304<br>SL063058<br>U010581 | TOWNE RESOURCES, INC. - FORMERLY (AMCA LEASING) | CARBON | 2242.39 | 2042.39 | U.G. | IMP. | 1.0 | 1982 | 30 | - | 0.75 | 0.99 | |
| GORDON CREEK 2 | U8319 | BEAVER CREEK COAL | CARBON | 1641.75 | 1081.75 | U.G. | A | 0.522 | 1962 | 16 | 0.535 | 0.522 | 0.522 | |
| SAGE POINT - DUGOUT CANYON | U07746<br>U089096<br>U092147<br>U0144820<br>U037821<br>U07064 | EUREKA ENERGY | CARBON | 10,044 | 10684.28 | U.G | I.M.P. | 3.2 | 1984 | 40 | .. | 0.63 | 2.65 | |
| SOLDIER CANYON | SL051279 | CALIF PORTLAND CEMENT | CARBON | 1548.31 | 1548.31 | U.G. | A | 0.75 | 1976 | 11 | 0.6245 | 0.72 | 0.65 | |
| SUNNYSIDE 1-2-3 | SL062966<br>U32083 | KAISER STEEL CORP | CARBON | 7031 | 1893.3 | U.G | A | 1.0 | 1978 | 20 | 1.0 | 1.0 | 1.0 | |
| BELINA No. 1,2 | U017354<br>U049076<br>U020305 | KANAWHA-HOCKING<br>ARMODA McKINNON<br>W. H. McKINNON EST | EMERY<br>EMERY<br>CARBON | 2740 | 1835.64 | U.G. | A | 1.5 | | 27 | 0.466 | 1.0 | 1.1 | |
| GENEVA | SL046612<br>SL066145 | U.S. STEEL | CARBON<br>EMERY | 3906 | 1832.17 | U.G | A | 0.67 | 1976 | 7 | .25 | 0.19 | – | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1977 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UINTA | | | | | | | | | | | | | | |
| O'CONNOR | (U020305)<br>U067498<br>(U017354)<br>(U044076) | M.H. McKinnon Est<br>Kanawha-Hocking<br>" "<br>Kanawha-Hocking | CARBON<br>CARBON<br>EMERY<br>EMERY | 2,740 | 1,530.17 | U.G. | I.M.P. | 1.3 | 1983 | 10 | - | 0.6 | 1.3 | |
| SKYLINE | (U020305)<br>U0142235<br>U073120<br>(U044076)<br>U0147570 | M.H. McKinnon Est<br>" " "<br>Kanawha-Hocking<br>Armeda McKinnon<br>M.H. McKinnon Est | CARBON<br>CARBON<br>CARBON<br>EMERY<br>EMERY | 7,032.14 | 3,169.92 | U.G | A | 5.4 | 1982 | 35 | - | 1.847 | 4.187 | |
| STAR POINT 1-2 | U7949<br>SL031286<br>U13097 | PLATEAU MINING | CARBON<br>CARBON<br>EMERY | 5,393.12 | 3,231.12 | U.G. | A | 1.3 | 1977 | 22 | 1.109 | 1.1 | 1.0 | |
| DES-BEE-DOVE | U02664<br>SL050133<br>SL066116 | UTAH POWER & LIGHT | EMERY | 2,280 | 1,400.0 | U.G. | A | 1.343 | 1976 | 13 | 1.3 | 1.3 | 1.3 | |
| EMERY DEEP | U5287 | CONSOLIDATION COAL | EMERY | 720.0 | 720.0 | U.G. | S | 0.6 | 1981 | 14 | - | 0.597 | 0.597 | |
| HIAWATHA | SL025431<br>SL069985<br>U026583 | UNITED STATES FUEL | EMERY | 15,126 | 5726.35 | U.G. | A | 3.0 | 1975 | 35 | 0.768 | 2.0 | 2.0 | |
| HUNTINGTON CANYON Nos 4-5 | SL064903<br>SL050641<br>U33454 | Swisher Coal Co<br>Intermountain Exploration<br>Swisher Coal Co | EMERY | 1,480 | 760.0 | U.G. | A | 1.32 | 1976 | 15 | | 0.5 | 0.54 | |
| TRAIL MOUNTAIN | U082996 | JOHN L. BELL | EMERY | 140.0 | 80.0 | U.G. | A | 0.06 | 1976 | 7 | 0.045 | 0.06 | - | |
| WILBERG-DEER CREEK | U01358<br>U040151<br>U083066<br>U084923<br>U084924<br>U044025<br>SL064607<br>SL064900<br>SL070645 | Utah Power & Light<br>Cooperative Security<br>" "<br>M.H. McKinnon Est<br>" " "<br>Cooperative Security<br>Utah Power & Light<br>Utah Power & Light<br>M.H. McKinnon Est | EMERY | 11,362.82 | 11,362.82 | U.G. | A | 6.04 | 1973 | 35 | 1.871 | 6.3 | 6.3 | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UINTA | | | | | | | | | | | | | | |
| ALTON | SL058575<br>SL064507<br>U0101153<br>U060745<br>U060746<br>U065012<br>U083072<br>U098705 | Nevada Electric Investment Company, | KANE | 28,635.67 | 27,494.02 | S | I.A.P. | 11.0 | ? | 22 | – | -- | – | |
| | U0105404<br>U0115938<br>U0122579<br>U0122582<br>U0122583<br>U0122584<br>U0122623<br>U0122647<br>U0122649<br>U0122650<br>U0122661<br>U0122652<br>U0122675<br>U0124768<br>U0126916<br>U0140770<br>U0147499<br>U0149502<br>U098774<br>U098775 | Utah International Incorporated | | | | | | | | | | | | |
| KAIPAROWITS Nos. 1-5 | U087805<br>U087806<br>U087807<br>U087828<br>U087833<br>U087834<br>U087835<br>U087836<br>U092138<br>U092139 | Mono Power Co., Resources Co., Albion Resources Co., Kaiser Industries Corp. | KANE | 47,767.79 | 40,277.25 | U.G. | I.M.P. | 12.0 | ? | 35 | - | - | - | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UINTA | | | | | | | | | | | | | | |
| KAIPAROWITS Nos 1-5 (CONTINUED) | U092140<br>U092141<br>U092142<br>U096486<br>U096494<br>U096495<br>U096496<br>U096497<br>U096508<br>U096509<br>U0101142 | | | | | | | | | | | | | |
| RED AND BLUE<br><br><br><br><br><br><br><br><br><br><br><br>#22 -> | U0115791<br>U0115792<br>U0115793<br>U0115833<br>U0130986<br>U0130988<br>U0130989<br>U0136612<br>U0140836<br>U0140837<br>U0148535<br>U0130985<br>U083100<br>U083005<br>U24427<br>U27855 | EL PASO ENERGY RESOURCES COMPANY | KANE | 40,545.80 | 27,658.12 | U.G. | I.M.P. | 6.8 | ? | 38 | - | - | - | |
| CONVULSION CANYON | SL061583<br>U062453<br>U0149084<br>U 28297 | COASTAL STATES ENERGY COMPANY | SEVIER | 6,191.81 | 5,551.81 | U.G. | A | 2.1 | 1976 | 22 | 1.698 | 2.0 | 2.1 | |
| SKUMPAH | U0141177 | ENERGY RESERVES | SEVIER | 6,520 | 2,504.37 | U.G. | I.M.P. | 2.0 | 1983 | 15 | - | 0.6 | 1.8 | |
| UTE 1 & 2 | U5135 | MOUNTAIN STATES RESOURCES | SEVIER | 5,251.99 | 3,571.99 | Both | I.M.P. | 2.7 | 1984 | 22 | - | 0.2 | 1.0 | |
| 25 | 128 | | | 234,868.02 | 172,282.63 | | | | | | 10.3495 | 24.916 | 36.031 | |

(All tonnages are in 10⁶ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | UTAH - UINTA LEASES | | | | | | | | | | | | | |
| # 1 | SL063720<br>U024814<br>U08606 | Carbon Emery Pact | CARBON | | 276.9 | U.G. | | | | | | | | |
| # 2 | U05067 | Eureka Energy Co | CARBON | | 320.0 | U.G. | | | | | | | | |
| # 3 | U02785<br>U039706 | Kaiser Steel Corp | | | 4919.16 | U.G. | | | | | | | | |
| | U25683 | Braztah Corp | CARBON | | 1172.71 | | | | | | | | | |
| #4 UTAH No. 2 | SL062605 | Kanawha-Hocking | CARBON | | 1052.68 | U.G. | Closed | | | | | | | |
| # 6 | U7653 | Carrol Cam..y Coal | EMERY | | 911.6 | U.G. | | | | | | | | |
| # 7 | U022918 | Charles Kingston | EMERY | | 120.0 | U.G. | | | | | | | | |
| # 8 | U073039 | Consolidation Coal | EMERY | | 18,025.94 | BOTH | | | | | | | | |
| | U073040 | Kemmerer Coal | EMERY | | | | | | | | | | | |
| | U073041 | " | EMERY | | | | | | | | | | | |
| | U0101213 | " | SEVIER | | | | | | | | | | | |
| | U0101214 | " | " | | | | | | | | | | | |
| | U0101215 | " | " | | | | | | | | | | | |
| | U0101217 | " | " | | | | | | | | | | | |
| | U0101218 | " | " | | | | | | | | | | | |
| | U090231 | " | SEVIER | | | | | | | | | | | |
| # 10 A | SL050655 | J. Sandberg Est | EMERY | | 80.0 | U.G. | | | | | | | | |
| 10B TIP TOP | SL062648 | " | " | | 80.0 | U.G. | | | | | | | | |
| # 11 | SL066490<br>SL069141<br>U0126947<br>U0126948<br>U014217<br>U014218 | Kaiser Steel Corp | EMERY | | 8331.21 | U.G. | | | | | | | | |
| # 12 | SL036407 | Lloyd Wilberg<br>Eliza Wilberg | EMERY | | 80.0 | U.G. | | | | | | | | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | UTAH - | UINTA LEASES | | | | | | | | | | | | |
| #13 | SL050862 | M.N. McKinnon Est. | EMERY | | 280.0 | U.G. | | | | | | | | |
| #14A | U020668<br>U 38727 | Nevada Electric Investment | EMERY | | 1,366.71 | U.G. | | | | | | | | |
| #14B | U024316 | Nevada Electric I | EMERY | | 1,800.0 | U.G. | | | | | | | | |
| #15A | SL051221<br>U019275<br>U024317<br>U024319<br>U06051 | Utah Power & Light | EMERY | | 2,960.0 | U.G. | | | | | | | | |
| # 5B | U024318 | Peabody Coal | EMERY | | 80.0 | U.G. | | | | | | | | |
| # 16 | U2810 | Smith-Holladay A | EMERY | | 80.0 | U.G. | | | | | | | | |
| #17 (Cerna Creek?) | U020691 | Swisher Coal Co | EMERY | | 1,908.66 | U.G. | | | | 40 | | | | |
| # 18 | SL071561 | Caesar Fulton | GARFIELD | | 80.0 | U.G. | | | | | | | | |
| #19A | SL048223 | George Frandsen | GARFIELD | | 120.0 | U.G. | | | | | | | | |
| #19B | SL050638 | George Frandsen | GARFIELD | | 40.0 | U.G. | | | | | | | | |
| #20 | SL049042 | Arron Rasmussen | KANE | | 40.0 | U.G. | | | | | | | | |
| #21 | U0103107<br>U0103109<br>U0103129<br>U0103130<br>U0105418<br>U0149373<br>U098783<br>U098784<br>U098785<br>U098787 | Consolidation Coal Company | KANE | | 15,533.41 | U.G. | | | | | | | | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | UTAH - | UINTA LEASES | | | | | | | | | | | | |
| So Nipple Butte | U0118366<br>U0120799<br>U0146654 | Hiko Bell Mining and Oil | Kane | | 6400.0 | U.G. | | | | 40 | | | | |
| #23 King Cannel | SL0564.19 | King Cannel Coal Co | Kane | | 240.0 | U.G. | | | | | | | | |
| # 25A | U0103108<br>U0103131<br>U0103132<br>U0103133<br>U0115656<br>U0115657<br>U096476<br>U096477<br>U098786 | Peabody Coal Co | Kane | | 19,162.64 | U.G. | | | | | | | | |
| # 25 B | U0101140<br>U0101141<br>U0113254 | Peabody Coal Co | Kane | | 3520.0 | U.G. | | | | | | | | |
| # 27 | U0103141 | S H West | Kane | | 960.88 | U.G. | | | | | | | | |
| # 29 | U053995 | Coastal States Energy | Sevier | | 160.0 | U.G. | | | | 40 | | | | |
| # 30 Rock Canyon | U0141171<br>U0141176<br>U0141178 | Energy Reserves Group, Inc. | Sevier | | 5,345.67 | U.G. | | | | | | | | |
| | 75 | | | | 104,998.17 | | | | | | | | | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NEW MEXICO - SAN JUAN RIVER | | | | | | | | | | | | | | |
| McKinley | NM057348<br>NM051349<br>NM0554844<br>NM065466 | Gulf Oil Corp | McKinley | 6,670 | 8,094.07 | S | A | 5.0 | 1961 | 33 | 4.366 | 5.0 | 5.0 | |
| La Ventana | NM0510466<br>NM0510467<br>NM0510468<br>NM0555316<br>NM0555317 | Ideal Basic Industries, Inc. | Sandoval | 6584 | 9,306.51 | U.G. | S | 3.0 | 1981 | 35 | - | 0.816 | 1.5 | |
| Bisti | NM0186612<br>NM0186613<br>NM0186615 | Western Coal Co | San Juan | 5775.78 | 5455.78 | S | S | 4.3564 | 1982 | 34 | - | 2.0 | 2.5 | |
| La Plata | NM0315559 | Cimarron Coal | San Juan | 480 | 2044.15 | S | No - | | | 10 | | | | No m.P |
| San Juan | NM015196<br>NM015197<br>NM043217 | Western Coal Co | San Juan | 6952.84 | 6832.84 | S | A | 5.5 | 1973 | 35 | 4.0 | 5.0 | 5.5 | |
| Star Lake | NM 2457 | Thermal Energy Co, Peabody Coal Co | McKinley | 18,220 | 6336.12 | S | | 8.0 | | 35 | | | | |
| 6 | 17 | | | 43,682.62 | 38,074.47 | | | | | | 8.366 | 12.816 | 14.5 | |
| OTHER NEW MEXICO - DENVER - RATON MESA | | | | | | | | | | | | | | |
| #1 | SF074673 | Robert Lee Davis | Colfax | | 40.0 | U.G. | | | | | | | | |
| #2 | SF066817 | Texas Industries | Colfax | | 120.0 | U.G. | | | | | | | | |
| #3 | SF042860 | Barney Urtado | Colfax | | 40.7 | U.G. | | | | | | | | |
| | 3 | | | | 200.7 | | | | | | | | | |

(All tonnages are in $10^6$ units)

| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTHER | NEW MEXICO - SAN | JUAN | | RIVER | | | | | | | | | | |
| #6 | SF07664 | James L. Simons | Rio Arriba | | 80.0 | U.G. | | | | | | | | |
| #7 | SF048323 | AMETEX Corp | SANDOVAL | | 120.0 | U.G. | | | | | | | | |
| # 8 | NM732 | AMETEX Corp | SANDOVAL | | 160.0 | U.G. | | | | | | | | |
| # 9 | SF075321<br>SF077779 | Florentino Tadilla | Sandoval | | 160.0 | U.G. | | | | | | | | |
| # 12 | NM10931 | Eastern Assoc Pur & Fannin Sullivan Co | San Juan | | 1910.2 | S | | | | | | | | |
| # 13 | SF077115 | Lloyd Ingraham | San Juan | | 160.0 | U.G. | | | | | | | | |
| # 16 | SF071948 | Western Coal Co | San Juan | | 40.0 | U.G. | | | | | | | | |
| (San Juan) | NM 28093 | Western Coal Co | San Juan | | 3855.6 | S | | | | | | | | |
| | 9 | | | | 6,485.8 | | | | | | | | | |

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| MINE NAME | LEASE NUMBER | LESSEE | COUNTY | TOTAL ACRES | TOTAL FEDERAL ACRES | MINE TYPE | MINE STATUS | MINE CAPACITY | START DATE | MINE LIFE | 1979 PRODUCTION | 1985 PRODUCTION | 1990 PRODUCTION | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OKLAHOMA - WESTERN INTERIOR | | | | | | | | | | | | | | |
| | BLMC031136 | HARDY HALL | HASKELL | | 1180.0 | | | | | | | | | |
| | BLMC027239 | HARDY HALL | HASKELL | | 880.0 | | | | | | | | | |
| | NM957 | Petroleum Internat'l | HASKELL | | 3341.43 | | | | | | | | | |
| | NM3174 | Petroleum Internat'l | COAL | | 2839.86 | | | | | | | | | |
| STARLIGHT | BLACC21851 | Lone Star Steel Co | HASKELL | | 1500.0 | S | A | 0.2 | 1977 | 10 | .027 | 0.2 | 0.2 | |
| STIGLER | BLMC030153 | Garland Coal & Min. | HASKELL | | 960.92 | S | A | 0.2 | 1978 | | 0.124 | | | |
| | NM023556 | Evans Coal Co | HASKELL | | 1686.73 | | | | | | | | | |
| | NM023555 | " | " | | 2560.0 | | | | | | | | | |
| | BLMI017564 | " | " | | 1347.12 | | | | | | | | | |
| | BLMC032224 | " | " | | 400.0 | | | | | | | | | |
| | BLMC028774 | " | " | | 640.0 | | | | | | | | | |
| | BLMC022012 | " | " | | 793.5 | | | | | | | | | |
| | NM24005 | Great Nat. Corp | HASKELL | | 140.0 | | | | | | | | | |
| | NM036953 | ASARCO | Le FLORE | | 1160.0 | | | | | | | | | |
| | BLMC031985 | " | " | | 1844.3 | | | | | | | | | |
| | BLMC032614 | " | " | | 1000.0 | | | | | | | | | |
| | NM033722 | " | " | | 2552.0 | | | | | | | | | |
| | NM033723 | " | " | | 2520.0 | | | | | | | | | |
| | BLMI017683 | Cameron Coal Co | Le FLORE | | 2560.0 | | | | | | | | | |
| | NM024892 | " | " | | 944.46 | | | | | | | | | |
| | NM029811 | " | " | | 960.0 | | | | | | | | | |
| | NM014015 | Carr Internat'l Min. | Le FLORE | | 360.0 | | | | | | | | | |
| | BLMI017612 | Evans Coal Co | Le FLORE | | 1848.65 | | | | | | | | | |
| | BLMC028369 | Evans Coal Co | Le FLORE | | 1000.00 | | | | | | | | | |
| | NM063636 | Freeman United Coal Mining | Le FLORE | | 560.55 | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OKLAHOMA | WESTERN | INTERIOR | | | | | | | | | | | | |
| | NM0161332 | Kenneth Gaither | Le Flore | | 2556.6 | | | | | | | | | |
| | NM033866 | Garland Coal | Le Flore | | 2047.71 | | | | | | | | | |
| | NM034621 | & Mining Co | " | | 2543.51 | | | | | | | | | |
| | NM0556624 | " | " | | 4374.67 | | | | | | | | | |
| | NM0557450 | " | " | | 880.0 | | | | | | | | | |
| | NM025632 | " | " | | 2266.34 | | | | | | | | | |
| | BLMC022499 | " | " | | 1384.78 | | | | | | | | | |
| | BLMC028370 | " | " | | 240.0 | | | | | | | | | |
| | BLMI018014 | " | " | | 326.54 | | | | | | | | | |
| | NM050405 | Lone Star Steel Co | Le Flore | | 1116.17 | | | | | | | | | |
| | BLMI018108 | Pacola Co | Le Flore | | 960.0 | | | | | | | | | |
| Borosite | BLMC035068<br>BLMC035069 | Garland Coal<br>& Mining Co | Le Flore | | 3470.37 | S | A | 0.280 | 1978 | 20 | 0.105 | 0.180 | 0.18 | |
| Milton | NM059992<br>BLMC018820 | Lone Star Steel Co | Le Flore | | 2595.16 | S | A | .07 | 1977 | 9 | 0.068 | 085 | | |
| Rees-Milton | BLMI017902 | Mining Systems Corp | Le Flore | | 1,800.0 | S | | | | | | | | |
| | BLMC031611 | Evans Coal Co | Pittsburg | | 2530.70 | | | | | | | | | |
| | BLMC029794 | " | " | | 2478.96 | | | | | | | | | |
| | BLMC030684 | " | " | | 2540.52 | | | | | | | | | |
| | BLMC018125 | Lone Star Steel Co | Pittsburg | | 2560.33 | | | | | | | | | |
| | NM054996 | " | " | | 718.88 | | | | | | | | | |
| | NM050406 | " | " | | 2400.31 | | | | | | | | | |
| 5 | 47 | | | | 74,270.72 | | | | | | | | | |

# APPENDIX 2

Tabular Summary of

Due Diligence Issues

(All tonnages are in $10^6$ units)

2-1

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | DOES LEASE BLOCK CONSTITUTE AN LMU BY ITSELF? WITH OTHER LEASES? WITH OTHER RESERVES? | WILL TRACT PRODUCE 2½% OF LMU RESERVES BY 1986? BY 1991? 10 YRS. AFTER DATE OF LEASE? | WILL LMU RESERVES BE MINED OUT IN 40 YEARS? | WILL MINE BE PRODUCING AT 1% OF LMU RESERVES/YR.? | WILL TRACT QUALIFY FOR POSSIBLE EXTENSION? STATE REASONS |
|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | |
| CANADIAN | 1 | Wyoming Fuel Co | ITSELF | 1986-yes | Yes | Yes | |
| COLOWYO | 1 | Colowyo Coal Co | ITSELF | 1986 yes | NO | yes | |
| EAGLE Nos 5,9 | 3 | Empire Energy Co | OTHER RESERVES | yes | yes | – | |
| TRAPPER | 4 | Utah International | OTHER RESERVES | 1986-yes | yes | Yes | |
| DESERADO | 2 | Western Fuels Assoc | ITSELF | 1991-yes | yes | yes | |
| MEEKER AREA | 5 | Northern Minerals | OTHER RESERVES | 1986-yes | yes | yes | |
| APEX No. 2 | 2 | Sunland Mining Corp | ITSELF | 1986 - yes | yes | yes | |
| EDNA | 4 | Gulf Oil Corp | OTHER Reserves | 1986- yes | Yes | yes | |
| TROUT CREEK | (1)* | Gulf Oil Corp | ITSELF | 1986- yes | Yes | yes | |
| ENERGY Nos. 1,2,3 | 6 | Energy Fuels Corp | OTHER Reserves | 1984- yes | yes | yes | |
| JOHNNIES | 1 | Prosper Lombardi | ITSELF | No - | No | No | No |
| SENECA 2W | 2 | Peabody Coal Co | OTHER Reserves | 1984 - yes | yes | yes | |
| NATIONAL KING COAL | 1 | National King Coal Co | ITSELF | 1986 - yes | yes | yes | |

(All tonnages are in $10^6$ units)

2-2

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | DOES LEASE BLOCK CONSTITUTE AN LMU BY ITSELF? WITH OTHER LEASES? WITH OTHER RESERVES? | WILL TRACT PRODUCE 25% OF LMU RESERVES BY 1986? BY 1991? 10 YRS. AFTER DATE OF LEASE? | WILL LMU RESERVES BE MINED OUT IN 40 YEARS? | WILL MINE BE PRODUCING AT 1% OF LMU RESERVES/YR.? | WILL TRACT QUALIFY FOR POSSIBLE EXTENSION? STATE REASONS |
|---|---|---|---|---|---|---|---|
| ORCHARD VALLEY | 2 | COLORADO WESTMORELAND | OTHER RESERVES | 1986 - yes | yes | yes | APPLICATION |
| RED CANYON No. 2 | 1 | GRAND MESA COAL CO | OTHER RESERVES | 1991 - yes | yes | yes | |
| SUMERSET | 3 | U.S. STEEL CORP. | ITSELF | 1986 - yes | NO | yes | |
| BLUE RIBBON | (1)[2] | SUNFLOWER ENERGY CO | OTHER RESERVES | 1986 - yes | yes | yes | |
| LOMA COMPLEX | 6 | SHERIDAN ENTERPRISES | ITSELF | 1986 - yes | yes | yes | |
| BEAR | 1 | ARCO | ITSELF | yes | yes | yes | |
| MT. GUNNISON | 2 + (1)[1] | ARCO | OTHER RESERVES | 1991 - yes | NO | yes | |
| COAL BASIN | 9 | MID-CONTINENT RESOURCES | OTHER RESERVES | 1986 - yes | NO | yes | |
| SNOWMASS | 2 | ANSCHUTZ COAL CO | ITSELF | 1991 - yes | NO | yes | |
| HAWKSNEST E&W | 4 | WESTERN SLOPE CARBON | ITSELF | 1986 - yes | yes | yes | |
| OHIO CREEK No. 2 | 1 | HENRY WEAVER | ITSELF | 1986 - yes | yes | yes | |
| WINDJAMMER NO. 1 | 1 | ANCHOR COAL CO | OTHER LEASES | 1986 - yes | NO | yes | |
| CAMEO NOS. 1, 2 | 1 | GEX COLORADO | OTHER RESERVES | 1986 - yes | yes | yes | |

(All tonnages are in $10^6$ units)

2-3

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | DOES LEASE BLOCK CONSTITUTE AN LMU BY ITSELF? WITH OTHER LEASES? WITH OTHER RESERVES? | WILL TRACT PRODUCE 2½% OF LMU RESERVES BY 1986? BY 1991? 10 YRS. AFTER DATE OF LEASE? | WILL LMU RESERVES BE MINED OUT IN 40 YEARS? | WILL MINE BE PRODUCING AT 1% OF LMU RESERVES/YR.? | WILL TRACT QUALIFY FOR POSSIBLE EXTENSION? STATE REASONS |
|---|---|---|---|---|---|---|---|
| COAL CANYON | 3 | Mid-Continent Coal & Coke | ITSELF | 1991 - yes | yes | yes | |
| COTTONWOOD CREEK | 3 | Mid-Continent Resources | OTHER RESERVES | No | NO | 1994 - yes | |
| ROADSIDE | 1 | GEX COLORADO | OTHER RESERVES | 1986 - yes | yes | yes | |
| UTAH | | | | | | | |
| B CANYON | 1 | U.S. STEEL CORP | OTHER RESERVES | 1991 - yes | yes | yes | |
| BRAZTAH Nos. 3,5,6,7 | 10 | FRANKLIN REAL ESTATE | OTHER RESERVES | 1986 - yes | (yes) | yes | |
| C & W No. 1 | 1 | WASATCH COAL Co | ITSELF | 1991 - yes | yes | yes | |
| PINNACLE (DEADMAN) | 3 | TOWER RESOURCES, INC. | OTHER RESERVES | 1986 - yes | yes | yes | |
| GORDON CREEK No. 2 | 1 | BEAVER CREEK COAL Co | OTHER RESERVES | 1986 - yes | yes | yes | |
| SAGE POINT - DUGOUT | 6 | EUREKA ENERGY Co | OTHER LEASES | 1991 - yes | yes | yes | |
| SOLDIER CANYON | 1 | CALIF. PORTLAND CEMENT | ITSELF | 1986 - yes | yes | yes | |
| SUNNY SIDE Nos. 1,2,3 | 2 | KAISER STEEL CORP. | OTHER LEASES | 1986 - yes | yes | yes | |
| BELINA NO. 1, 2 | 3 | KANAWHA - HOCKING | OTHER LEASES | 1986 - yes | yes | yes | |

(All tonnages are in 10<sup>6</sup> units)

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | DOES LEASE BLOCK CONSTITUTE AN LMU BY ITSELF? WITH OTHER LEASES? WITH OTHER RESERVES? | WILL TRACT PRODUCE 25% OF LMU RESERVES BY 1986? BY 1991? 10 YRS. AFTER DATE OF LEASE? | WILL LMU RESERVES BE MINED OUT IN 40 YEARS? | WILL MINE BE PRODUCING AT 1% OF LMU RESERVES/YR.? | WILL TRACT QUALIFY FOR POSSIBLE EXTENSION? STATE REASONS |
|---|---|---|---|---|---|---|---|
| GENEVA | 2 | U.S. STEEL CORP | OTHER RESERVES | yes | yes | yes | |
| O'CONNOR | 1 +(3)* | VALLEY CAMP - UTAH | OTHER LEASES | 1986 - yes | yes | yes | |
| SKYLINE | 3 +(2)* | COASTAL STATES | OTHER LEASES | 1986 - yes | yes | yes | |
| STAR POINT NOs. 1,2 | 3 | PLATEAU MINING | OTHER LEASES | 1986 - yes | (yes) | yes | |
| DES-BEE-DOVE | 3 | UTAH POWER & LIGHT | OTHER LEASES | 1986 - yes | yes | yes | |
| EMERY | 1 | CONSOLIDATION COAL | ITSELF | 1986 - yes | yes | yes | |
| HIAWATHA | 3 | UNITED STATES FUEL | OTHER LEASES | 1986 - yes | yes | yes | |
| HUNTINGTON CANYON | 3 | SWISHER COAL CO | OTHER RESERVES | 1986 - yes | yes | yes | |
| TRAIL MOUNTAIN | 1 | JOHN L. BELL | OTHER RESERVES | 1986 - yes | yes | yes | |
| WILBERG - DEER CREEK | 9 | UTAH POWER & LIGHT | ITSELF | 1986 - yes | yes | yes | |
| ALTON | 28 | UTAH INTERNAT'L & NEI. | OTHER LEASES | No | NO | NO | No - Envir. |
| KAIPAROWITS | 21 | MONO POWER, ET. AL. | OTHER LEASES | No | No | No | No Envir. |
| RED & BLUE | 16 | EL PASO ENERGY CO | OTHER LEASES | NO | NO | No | |

(All tonnages are in $10^6$ units)

2-5

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | DOES LEASE BLOCK CONSTITUTE AN LMU BY ITSELF? WITH OTHER LEASES? WITH OTHER RESERVES? | WILL TRACT PRODUCE 2½% OF LMU RESERVES BY 1986? BY 1991? 10 YRS. AFTER DATE OF LEASE? | WILL LMU RESERVES BE MINED OUT IN 40 YEARS? | WILL MINE BE PRODUCING AT 1% OF LMU RESERVES/YR.? | WILL TRACT QUALIFY FOR POSSIBLE EXTENSION? STATE REASONS |
|---|---|---|---|---|---|---|---|
| CONVULSION CANYON | 4 | COASTAL STATES | OTHER LEASES | yes | Yes | yes | |
| SKUMPAH CANYON | 1 | ENERGY RESERVES | OTHER LEASES | 1991 - yes | YES | yes | |
| UTE Nos. 1, 2 | 1 | MOUNTAIN STATES RESOURCES | OTHER LEASES | 1991 - yes | NO | yes | |
| NEW MEXICO | | | | | | | |
| MC KINLEY | 4 | GULF OIL CORP | OTHER LEASES | 1986 - yes | yes | yes | |
| STAR LAKE | 1 | THERMAL ENERGY | OTHER LEASES | | | | |
| LA VENTANA | 5 | IDEAL BASIC IND. | ITSELF | 1986 - yes | yes | yes | |
| BISTI | 3 | WESTERN COAL CO | OTHER LEASES | 1986 - yes | yes | yes | |
| LA PLATA | 1 | CIMARRON COAL CO | ITSELF | | | | |
| SAN JUAN | 3 | WESTERN COAL CO | OTHER LEASES | 1986 - yes | yes | yes | |
| OKLAHOMA | | | | | | | |
| BOKOSHE | 2 | GARLAND COAL & MINING | OTHER RESERVES | 1986 yes | yes | yes | |

# APPENDIX 3

## Tabular Summary of
## Production Potential by Lease Block

(All tonnages are in $10^6$ units)

3-1

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | | | |
| CANADIAN | 1 | Wyoming Fuel Co | A | 0.731 | OSM | 0.65 | 0.92 | – | – |
| COLOWYO | 1 | Colowyo Coal Co | A | 148.5 | M.P | 28.11 | 4.5 | 50.61 | 4.5 |
| EAGLE No 5,9 | 3 | Empire Energy Co | A | 6.639 | M.P. | 9.229 | – | – | – |
| TRAPPER | 4 | Utah International | A | 62.4 | IC | 20.129 | 2.3 | 31.629 | 2.3 |
| DESERADO | 2 | Western Fuels Assoc | S | 30.992 | M.P. | 0.593 | 0.786 | 6.503 | 1.356 |
| MEEKER AREA | 5 | Northern Minerals Co | A | 104.9 | M.P. | 13.199 | 3.8 | 33.559 | 4.8 |
| APEX No 2 | 2 | Sunland Mining Corp | A | 1.222 | M.P. | 0.5 | 0.1 | 1.1 | 0.1 |
| EDNA | 4 | Gulf Oil Corp | A | 12.77 | M.P. | 9.06 | 1.1 | 14.6 | – |
| TROUT CREEK | (1)* | Gulf Oil Corp | I.M.P. | 4.9 | M.P | 1.74 | 0.48 | 4.19 | 0.48 |
| ENERGY Nos. 1,2,3 | 6 | Energy Fuels Corp | A | 62.0 | M.P. | 40.8 | 3.9 | 59.58 | 3.9 |
| JOHNNIES | 1 | Prosper Lombardi | I.M.P. | 0.1195 | USGS | – | – | – | – |
| SENECA 2W | 2 | Peabody Coal Co | A | 11.571 | USGS | 16.111 | 2.5 | 28.611 | 2.5 |
| NATIONAL KING COAL | 1 | National King Coal Co | A | 0.7 | M.P. | 20.67 | 0.065 | - | - |

(All tonnages are in $10^6$ units)

3-2

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PPOD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| ORCHARD VALLEY | 2 | COLORADO WESTMORELAND | A | 5.6 | BLM | 6.62 | 1.3 | 13.12 | 1.3 |
| RED CANYON No. 2 | 1 | GRAND MESA COAL CO | S | 5.0 | N.F. | - | - | 0.4 | 0.4 |
| SOMERSET | 3 | U.S. STEEL CORP | A | 62.852 | M.P. | 12.612 | 0.94 | 17.312 | 0.94 |
| BLUE RIBBON | (1)* | SUNFLOWER ENERGY | S | 1.6 | IC | 0.288 | 0.104 | 0.808 | 0.104 |
| LOMA COMPLEX (McCLANE & MUNGER ONLY) | 6 | SHERIDAN ENTERPRISES | S | 100.0 | M.P. | 5.4 | 2.5 | 23.4 | 5.0 |
| BEAR | 1 | ARCO | A | 0.981 | USGS | – | – | – | – |
| MT GUNNISON | 2 +(1)* | ARCO | S | 202.95 | EIS | 1.46 | 0.98 | 8.86 | 2.23 |
| COAL BASIN | 9 | MID CONTINENT RESOURCES | A | 65.854 | USGS | 6.97 | 0.85 | 11.22 | 0.85 |
| SNOWMASS | 2 | ANSCHUTZ COAL | S | 42.517 | IC | – | – | 1.905 | 1.0 |
| HAWKSNEST E. & W. | 4 | WESTERN SLOPE CARBON | A | 35.0 | IC | 9.35 | 1.25 | 15.8 | 1.4 |
| OHIO CREEK No. 2 | 1 | HENRY WEAVER | A | 0.29 | USGS | 0.292 | 0.012 | 0.352 | 0.012 |
| WINDJAMMER No. 1 | 1 | ANCHOR COAL CO | I.M.P. | 5.4 | EIS | 0.3 | 0.12 | 0.9 | 0.12 |
| CAMEO Nos. 1 - 2 | 1 | GEX COLORADO | A | 31.992 | M.P. | 6.341 | 1.0 | 11.991 | 1.4 |

(All tonnages are in $10^6$ units)

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| COAL CANYON | 3 | Mid Continent Coal & Cok | I. M.P. | 15.851 | EIS | – | 0.1 | 1.5 | 0.5 |
| COTTONWOOD CREEK | 3 | Mid-Continent Resourc | I.M.P. | 49.88 | M.P. | – | – | 1.068 | 0.267 |
| ROADSIDE | 1 | GFX COLORADO | A | 5.0 | M.P. | 6.737 | 0.26 | – | – |
| 27 | 72 | | | 1078.2115 | | | | | |
| UTAH | | | | | | | | | |
| B CANYON | 1 | U.S. STEEL CORP | I.M.P. | 20.6 | EIS | – | – | 1.687 | 0.98 |
| BRAZTAH 3,5,6,7 | 10 | FRANKLIN REAL ESTATE | A | 142.61 | IC | 36.1 | 3.6 | 60.6 | 6.5 |
| C AND W NO. 1 | 1 | WASATCH COAL CO | I.M.P. | 1.57 | M.P. | – | – | 0.5 | 0.2 |
| PINNACLE (DEADMAN) | 3 | TOWER RESOURCES INC | I.M.P. | 22.4 | EIS | 1.95 | 0.84 | 6.61 | 0.99 |
| GORDON CREEK No. 2 | 1 | BEAVER CREEK COAL CO | A | 8.478 | U.S.G.S. | 4.776 | 0.522 | 7.386 | 0.522 |
| SAGE POINT - DUGOUT | 6 | EUREKA ENERGY CO | I. M.P | 111.0 | M.P. | 0.75 | 1.0 | 9.2 | 3.1 |
| SOLDIER CANYON | 1 | CALIF. PORTLAND CEMEN | A | 12.31 | I.S. | 7.51 | 0.72 | 10.95 | 0.625 |
| SUNNYSIDE NOS 1,2,3 | 2 | KAISER STEEL CORP | A | 20.0 | M.P. | 9.63 | 1.0 | 14.63 | 1.0 |

(All tonnages are in $10^6$ units)

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| BELINA NO. 1, 2 | 3 | KANAWHA-HOCKING | A | 39.5 | EIS | 5.12 | 1.0 | 10.22 | 1.1 |
| GENEVA | 2 | U.S. STEEL CORP. | A | 2.407 | IC | 21.41 | 0.19 | – | – |
| O'CONNOR | 1 + (3)$^4$ | VALLEY CAMP-UTAH | I. M.P. | 13.5 | EIS | 1.2 | 0.8 | 6.5 | 1.3 |
| SKYLINE | 3 + (2)$^4$ | COASTAL STATES | A | 124.5 | M.P. | 4.568 | 2.317 | 19.853 | 4.667 |
| STARPOINT Nos 1, 2 | 3 | PLATEAU MINING | A | 32.5 | M.P. | 11.77 | 1.2 | 17.37 | 1.0 |
| DES-BEE-DOVE | 3 | UTAH POWER & LIGHT | A | 16.9 | IC | 11.18 | 1.3 | 17.68 | 1.3 |
| EMERY | 1 | CONSOLIDATION COAL | S | 8.198 | M.P. | 2.401 | 0.597 | 5.386 | 0.597 |
| HIAWATHA COMPLEX | 3 | UNITED STATES FUEL | A | 33.6 | IC | 25.86 | 2.0 | 35.86 | 2.0 |
| HUNTINGTON CANYON | 3 | SWISHER COAL CO | A | 10.0 | M.P. | 2.9 | 0.54 | 5.46 | 0.54 |
| TRAIL MOUNTAIN | 1 | JOHN L. BELL | A | 3.2 | USGS | 0.5 | 0.05 | – | – |
| WILBERG-DEER CREEK | 9 | UTAH POWER & LIGHT | A | 120.41 | M.P. | 41.9 | 6.3 | 73.4 | 6.3 |
| ALTON | 28 | UTAH INTERNATL & M.E.I | I. M.P. | 320.0 | IC | – | – | – | – |
| KAIPAROWITS | 21 | MONO POWER ET. AL | I. M.P. | 397.0 | IC | – | – | – | – |
| RED AND BLUE | 16 | EL PASO ENERGY | I. M.P. | 206.0 | EIS | – | – | – | – |
| CONVULSION CANYON | 4 | COASTAL STATES ENERGY | A | 50.0 | IC | 20.03 | 2.1 | 30.53 | 2.1 |

(All tonnages are in $10^6$ units)

3-5

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 19[illegible] PROD |
|---|---|---|---|---|---|---|---|---|---|
| SKUMPAH CANYON | 1 | ENERGY RESERVES | I.M.P. | 41.0 | EIS | 1.0 | 0.9 | 7.7 | 2.0 |
| UTE Nos 1 & 2 | 1 | MOUNTAIN STATES RES | I.M.P. | 97.102 | M.P. | 0.3 | 0.4 | 4.0 | 1.0 |
|  |  |  |  | 1851.785 |  |  |  |  |  |
| NEW MEXICO |  |  |  |  |  |  |  |  |  |
| Mc KINLEY | 4 | GULF OIL CORP | A | 127.5 | I.S. |  |  |  |  |
| STAR LAKE | 1 | THERMAL ENERGY | S. | 265.0 | M.P. |  |  |  |  |
| LA VENTANA | 5 | IDEAL BASIC IND. | S. | 42.1832 | M.P. | 2.268 | 1.07 | 9.122 | 1.5 |
| BISTI | 3 | WESTERN COAL CO | S | 87.128 | M.P. | 3 37 | 2.5 | 15.87 | 3.0 |
| LA PLATA | 1 | CIMARRON COAL CO | S | 60.0 | I.S. |  |  |  |  |
| SAN JUAN | 3 | WESTERN COAL CO | A | 66.0 | M.P. | 35.51 | 5.0 | 61.51 | 5.5 |
|  |  |  |  | 647.8112 |  |  |  |  |  |
| OKLAHOMA |  |  |  |  |  |  |  |  |  |
| BOKOSHE | 2 | GARLAND COAL & MINING | A. | 6.575 | M.P | 2.265 | 0.18 | 3.165 | 0.18 |

(All tonnages are in $10^6$ units)

# UNDEVELOPED LEASES

3-6

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | | | |
| # 6 | 1 | Peabody Coal Co | Fav. | 6.0 | IC | | | | |
| # 28 | 8 | U.S. Steel Corp | Fav. | 45.0 | IC | | | | |
| # 1 | 1 | AMCA Coal Leasing | Uncert. | 1.8 | IC | | | | |
| # 5 | 1 | W. R. Grace | Uncert. | 15.8 | IC | | | | |
| # 8 | 1 | Peabody Coal Co | Uncert. | 29.0 | IC | | | | |
| # 9 | 1 | Ruby Construction Co | Uncert. | 1.4 | IC | | | | |
| # 12 | 1 | Consolidation Coal | Uncert. | 57.0 | IC | | | | |
| # 13 | 1 | Consolidation Coal | Uncert. | 4.5 | IC | | | | |
| # 14 | 1 | onsolidation Coal | Uncert. | 41.0 | IC | | | | |
| # 15 | 2 | Northern Minerals | Uncert. | 145.0 | IC | | | | |
| # 16 | 1 | Utah International | Uncert | 161.0 | IC | | | | |
| # 23 | 1 | U.S. Steel Corp | Uncert. | 16.0 | IC | | | | |
| # 24 | 1 | U.S. Steel Corp | Uncert. | 6.5 | IC | | | | |

(All tonnages are in $10^6$ units)

UNDEVELOPED LEASES

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| # 25 | 1 | U.S. Steel | UnCert. | 4.0 | IC | | | | |
| 14 | 22 | | | 534.0 | | | | | |
| UTAH | | | | | | | | | |
| # 3 | 2 | Kaiser Steel Corp | FAV | 50.0 | IC | | | | |
| # 8 | 9 | Consolidation Coal | FAV | 155.25 | IC | | | | |
| # 11 | 6 | Kaiser Steel Corp | FAV. | 66.0 | IC | | | | |
| # 14A | 2 | Nevada Electric Inv. | FAV | 20.0 | IC | | | | |
| # 14B | 1 | Nevada Electric Inv | FAV | 18.0 | IC | | | | |
| # 15A | 5 | Utah Power & Light | FAV | 42.0 | IC | | | | |
| # 17 | 1 | Swisher Coal Co | FAV | 28.0 | IC | | | | |
| # 30 | 3 | Energy Reserves Grp. | FAV | 29.0 | IC | | | | |
| # 2 | 1 | Eureka Energy Co | UnCert. | 1.2 | IC | | | | |
| # 21 | 10 | Consolidation Coal | UnCert. | 406.0 | IC | | | | |
| # 29 | 1 | Coastal States | Uncertain | 0.5 | IC | | | | |
| 11 | 41 | | | 815.95 | | | | | |

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(All tonnages are in $10^6$ units)

UNDEVELOPED LEASES

| LEASE BLOCK MINE PLAN | NUMBER OF LEASES | LESSEE | DEVELOPMENT STATUS | RECOVERABLE RESERVES | SOURCE | CUM PROD 1985 | EST. 1986 PROD | CUM PROD 1990 | EST. 1991 PROD |
|---|---|---|---|---|---|---|---|---|---|
| NEW MEXICO | | | | | | | | | |
| # 1 | 1 | Robert Lee Davis | UNCERT | 0.4 | IC | | | | |
| # 3 | 1 | Barry URTADO | UNCERT | | | | | | |
| # 8 | 2 | AMETEX CORP | UNCERT | 1.67 | IC | | | | |
| # 9 | 2 | Florentino Padilla | UNCERT | | | | | | |
| # 12 | 1 | Eastern Assoc Prop | UNCERT | 33.0 | IC | | | | |
| 5 | 7 | | | 35.07 | | | | | |

# APPENDIX 4

## Tabular Summary of Annual Production

## By Lease Block: 1980-1990

(All tonnages are in $10^6$ units)

4-1

| STATE<br>REGION<br>MINE PLAN | PROJECTED PRODUCTION | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
| COLORADO | | | | | | | | | | | | | |
| GREEN RIVER | | | | | | | | | | | | | |
| CANADIAN | 0.098 | 0.092 | 0.092 | 0.092 | 0.092 | 0.092 | 0.092 | 0.092 | 0.092 | | | | |
| COLOWYO | 1.699 | 2.7 | 3.0 | 3.5 | 4.0 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| EAGLE Nos. 5 & 9 | 0.729 | 1.2 | 1.35 | 1.45 | 1.5 | 1.5 | 1.5 | | | | | | |
| TRAPPER | 2.329 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| DESERADO | | | | | | 0.125 | 0.468 | 0.786 | 1.056 | 1.356 | 1.356 | 1.356 | 1.356 |
| MEEKER AREA | 0.089 | 0.40 | 1.0 | 1.75 | 2.75 | 3.41 | 3.8 | 3.8 | 3.8 | 4.0 | 4.3 | 4.5 | 4.8 |
| APEX No. 2 | | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| EDNA | 1.166 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | |
| TROUT CREEK | | | | 0.3 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 |
| ENERGY NOS. 1 & 2, 3 | 3.433 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| JOHNNIES | | | | | | | | | | | | | |
| SENECA 2W | 1.611 | 2.0 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 12 | 11.154 | 13.792 | 15.392 | 16.992 | 18.722 | 20.007 | 20.74 | 19.558 | 19.828 | 20.236 | 20.536 | 20.736 | 19.936 |

(All tonnages are in $10^6$ units)

4-2

| STATE<br>REGION<br>MINE PLAN | PROJECTED PRODUCTION<br>1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | | | | | | | |
| SAN JUAN RIVER | | | | | | | | | | | | | |
| NATIONAL KING COAL | 0.83 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.0325 | | | | |
| | 0.83 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.0325 | | | | |
| COLORADO-UINTA | | | | | | | | | | | | | |
| ORCHARD VALLEY | 0.722 | 0.7 | 0.7 | 0.7 | 1.0 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| RED CANYON No. 2 | | | | | | | | | | | 0.1 | 0.3 | 0.4 |
| SOMERSET | 0.906 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 |
| BLUE RIBBON | | | | 0.03 | 0.05 | 0.104 | 0.104 | 0.104 | 0.104 | 0.104 | 0.104 | 0.104 | 0.104 |
| LOMA COMPLEX | .003 | | | 0.3 | 0.9 | 1.7 | 2.5 | 2.5 | 3.0 | 3.5 | 4.0 | 5.0 | 6.0 |
| BEAR | 0.262 | 0.25 | 0.25 | 0.225 | 0.2 | 0.1 | | | | | | | |
| MT. GUNNISON | | | | | 0.25 | 0.98 | 0.73 | 0.98 | 1.23 | 1.48 | 1.73 | 1.98 | 2.23 |
| COAL BASIN MINES | 0.763 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.86 |
| SNOW MASS | | | | | | | | | 0.08 | 0.2 | 0.625 | 1.0 | 1.0 |
| HAWKSNEST EAST & WEST | 0.436 | 0.8 | 0.8 | 1.0 | 1.1 | 1.2 | 1.2 | 1.25 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 |

(All tonnages are in $10^6$ units)

4-3

| STATE<br>REGION<br>MINE PLAN | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | PROJECTED PRODUCTION |  |  |  |  |  |  |  |  |  |  |  |  |
| OHIO CREEK No 2 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 |
| WINDJAMMER No. 1 |  |  |  |  | 0.06 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| CAMEO Nos. 1 & 2 | 0.795 | 0.795 | 0.795 | 0.846 | 0.9 | 0.95 | 0.975 | 1.0 | 1.05 | 1.1 | 1.2 | 1.3 | 1.4 |
| COAL CANYON |  |  |  |  |  |  |  | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 |
| COTTONWOOD CREEK |  |  |  |  |  |  |  |  | 0.267 | 0.267 | 0.267 | 0.267 | 0.267 |
| ROADSIDE | 0.827 | 0.830 | 0.90 | 0.9 | 1.24 | 0.9 | 0.75 | 0.26 |  |  |  |  |  |
|  | 4.726 | 5.177 | 5.247 | 5.803 | 7.502 | 8.656 | 9.481 | 9.416 | 10.453 | 11.473 | 12.948 | 14.973 | 15.523 |
| UTAH |  |  |  |  |  |  |  |  |  |  |  |  |  |
| UINTA |  |  |  |  |  |  |  |  |  |  |  |  |  |
| B CANYON |  |  |  |  |  |  |  |  |  | 0.402 | 0.6 | 0.685 | 0.98 |
| BRAZTAH 3,5,6,7 | 0.733 | 1.0 | 1.25 | 1.5 | 2.0 | 2.5 | 3.0 | 3.6 | 4.5 | 4.9 | 5.4 | 6.1 | 6.5 |
| C & W No 1 |  |  |  |  |  |  |  |  | 0.05 | 0.1 | 0.15 | 0.2 | 0.2 |
| PINNACLE (Deadman) |  |  |  | 0.2 | 0.4 | 0.6 | 0.75 | 0.84 | 0.93 | 0.95 | 0.95 | 0.99 | 0.99 |

(All tonnages are in $10^6$ units)

A - 4

| STATE<br>REGION<br>MINE PLAN | PROJECTED PRODUCTION<br>1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GORDON CREEK 2 | 0.535 | 0.5 | 0.5 | 0.5 | 0.522 | 0.522 | 0.522 | 0.522 | 0.522 | 0.522 | 0.522 | 0.522 | 0.522 |
| SAGE POINT - DUGOUT | | | | | | 0.12 | 0.63 | 1.0 | 1.2 | 1.6 | 2.0 | 2.65 | 3.1 |
| SOLDIER CANYON | 0.6245 | 0.65 | 0.65 | 0.65 | 0.7 | 0.72 | 0.72 | 0.72 | 0.72 | 0.7 | 0.65 | 0.65 | 0.625 |
| SUNNYSIDE Nos. 1,2,3 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| BELINA No. 1, 2 | 0.466 | 0.5 | 0.65 | 0.75 | 0.85 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.1 | 1.1 |
| GENEVA | 0.25 | 0.25 | 0.25 | 0.25 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | | | | |
| O'CONNOR | | | | | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.1 | 1.1 | 1.3 | 1.3 |
| SKYLINE | | | | 0.437 | 0.907 | 1.377 | 1.847 | 2.317 | 2.787 | 3.257 | 3.727 | 4.197 | 4.667 |
| STAR POINT Nos. 1,2 | 1.109 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.2 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 |
| DES-BEE-DOVE | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| EMERY DEEP | | | 0.2 | 0.5 | 0.567 | 0.597 | 0.597 | 0.597 | 0.597 | 0.597 | 0.597 | 0.597 | 0.597 |
| HIAWATHA COMPLEX | 0.768 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| HUNTINGTON CANYON 4,5 | | 0.4 | 0.4 | 0.45 | 0.45 | 0.5 | 0.5 | 0.54 | 0.54 | 0.54 | 0.54 | 0.54 | 0.64 |
| TRAIL MOUNTAIN | 0.045 | 0.05 | 0.06 | 0.06 | 0.075 | 0.06 | 0.06 | 0.05 | 0.05 | ... | ... | ... | ... |

(All tonnages are in $10^6$ units)

4-5

| STATE<br>REGION<br>MINE PLAN | PROJECTED PRODUCTION<br>1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WILBERG - DEER CREEK | 1.871 | 3.6 | 5.26 | 6.0 | 6.1 | 6.2 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 |
| ALTON | | | | | | | | | | | | | |
| KAIPAROWITS | | | | | | | | | | | | | |
| RED AND BLUE | | | | | | | | | | | | | |
| CONVULSION CANYON | 1.698 | 1.8 | 1.83 | 1.87 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| SKUMPAH CANYON | | | | | 0.1 | 0.3 | 0.6 | 0.9 | 1.2 | 1.3 | 1.5 | 1.8 | 2.0 |
| UTE Nos. 1, 2 | | | | | | 0.1 | 0.2 | 0.4 | 0.6 | 0.8 | 0.9 | 1.0 | 1.0 |
| | 10.3495 | 13.15 | 15.45 | 17.567 | 19.301 | 21.586 | 24.916 | 27.376 | 29.786 | 31.568 | 33.436 | 36.031 | 37.821 |
| NEW MEXICO | | | | | | | | | | | | | |
| SAN JUAN RIVER | | | | | | | | | | | | | |
| MC KINLEY | 4.366 | 4.6 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| STARLAKE | | | | | | | | | | | | | |
| LA VENTANA | | | 0.168 | 0.293 | 0.482 | 0.569 | 0.816 | 1.07 | 1.284 | 1.5 | 1.5 | 1.5 | 1.5 |

(All tonnages are in $10^6$ units)

| STATE<br>REGION<br>MINE PLAN | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PROJECTED PRODUCTION | | | | | | | | | | | | |
| BISTI | | | | 0.12 | 0.25 | 1.0 | 2.0 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 3.0 |
| LA PLATA | | | | | | | | | | | | | |
| SAN JUAN | 4.0 | 4.0 | 4.0 | 4.5 | 4.5 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.5 | 5.5 | 5.5 |
| | 8.366 | 8.6 | 9.108 | 9.913 | 10.232 | 11.569 | 12.816 | 13.57 | 13.784 | 14.0 | 14.5 | 14.5 | 15.0 |
| OKLAHOMA | | | | | | | | | | | | | |
| STARLIGHT | | | | | | | | | | | | | |
| STIGLER | | | | | | | | | | | | | |
| BOKOSHE | .105 | 0.180 | 0.36 | 0.36 | 0.36 | 0.36 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| MILTON | | | | | | | | | | | | | |

(All tonnages are in $10^6$ units)

FAVORABLE LEASE BLOCKS

PROJECTED PRODUCTION

| STATE REGION MINE PLAN | MAX PROD | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | | | | | | | | |
| BLOCK 28 | 1.0 | | | | | | | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| UTAH | | | | | | | | | | | | | | |
| BLOCK 2 | 2.0 MAX | | | | | | | | | 0.1 | 0.3 | 0.5 | 0.8 | 1.0 |
| BLOCK 8 | 3.5 MAX | | | | | | | | | | 0.2 | 0.8 | 1.6 | 2.0 |
| BLOCK 1 | 2 0 | | | | | | | | | | 0.1 | 0.6 | 1.5 | 2.0 |
| BLOCK 14 | 1.5 | | | | | | | | | | | 0.3 | 0.8 | 1.5 |
| BLOCK 15 | 1.0 | | | | | | | | | | | | | POST 1991 |
| BLOCK 17 | 1.0 | | | | | | | | | | | | 0.2 | 0.5 |
| BLOCK 30 | 1.0 | | | | | | | | | | | | | POST 1991 |
| NEW MEXICO | | | | | | | | | | | | | | |
| BLOCK 11 | 1.0 | | | | | | | | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.0 |
| BLOCK 10 | 0 7 | | | | | | | | | 0.1 | 0.3 | 0.5 | 0.7 | 0.7 |

# APPENDIX 5

## Tabular Summary of Mining and Reclamation Problems

(All tonnages are in $10^6$ units)

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | MINE TYPE | MINING EQUIPMENT | MINE LIFE (YEARS) | MAXIMUM DESIGN CAPACITY | CURRENT OPERATING CAPACITY | NOTES ON MINING OR RECLAMATION CONDITIONS AFFECTING PRODUCTION |
|---|---|---|---|---|---|---|---|---|
| COLORADO | | | | | | | | |
| CANADIAN | 1 | Wyoming Fuel Co | S, OP.B.H. | T&S, FEL. | 7 | 0.12 | 0.092 | Haul Back, Dip 22-35% |
| COLOWYO | 1 | Colowyo Coal Co | S, O.P. | T&S, DL., W.S. | 26 | 4.5 | 2.7 | Steep slopes |
| EAGLE No 5.9 | 3 | Empire Energy Co | U.G. | CM, SC. | 5 | 3.0 | 1.2 | AVF |
| TRAPPER | 4 | Utah International | S. | DL, FEL, T., D.H. | 33 | 2.8 | 2.3 | Dipline Mng. |
| DESERADO | 2 | Western Fuels Assoc | U.G. | L.W., F.[illegible] | 20 | 1.8 | - | |
| Meeker Area | 5 | Northern Minerals Co | U.G. | C.M., SC. | 29 | 4.8 | 0.4 | |
| APEX No. 2 | 2 | Sunland Mining Corp | U.G | C.M., SC. | 12 | 0.1 | 0.1 | |
| EDNA | 4 | Gulf Oil Corp | S. | WS, DL., T&S | 10 | 1.1 | 1.1 | |
| TROUT CREEK | (1)* | Gulf Oil Corp | U.G | C.M. or Conv S.C. | 10 | 0.48 | - | |
| Energy Nos 1.2.3 | 6 | Energy Fuels Corp | S. | DL., D., FEL, T | 15 | 3.9 | 3.9 | |
| Johnnies | 1 | Pioneer Lombardi | U.G | Conv | | 0.01 | - | |
| SENECA 2W | 2 | Peabody Coal Co | S. | DL, D., F.[illegible], T | 15 | 2.5 | 2.0 | |
| National King Coal | 1 | National King Coal Co | U.G. | C.M | 7 | 0.07 | 0.065 | |

* INDICATES LEASE SERIAL NUMBER IS COUNTED IN ANOTHER MINE PLAN.

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(All tonnages are in $10^6$ units)

5-2

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | MINE TYPE | MINING EQUIPMENT | MINE LIFE (YEARS) | MAXIMUM DESIGN CAPACITY | CURRENT OPERATING CAPACITY | NOTES ON MINING OR RECLAMATION CONDITIONS AFFECTING PRODUCTION |
|---|---|---|---|---|---|---|---|---|
| ORCHARD VALLEY | 2 | COLORADO WESTMORELAND | U.G. | C.M., S.C. | 8 | 1.3 | 1.3 | |
| RED CANYON No. 2 | 1 | GRAND MESA COAL CO | U.G. | C.M. | 20 | 0.4 | – | |
| SOMERSET | 3 | U.S. STEEL CORP | U.G. | C.M., S.C. | 20 | 0.94 | 0.94 | METHANE, BAD ROOF |
| BLUE RIBBON | (1)* | SUNFLOWER ENERGY | U.G. | CONV. | 16 | 0.268 | – | |
| LOMA COMPLEX | 6 | SHERIDAN ENTERPRISES | U.G. | L.W., C.M. | 30 | 5.0 | | |
| BEAR | 1 | ARCO | U.G. | C.M., S.C. | 5 | 0.275 | 0.25 | |
| MT. GUNNISON | 2 + (1)* | ARCO | U.G. | C.M., SC. | 28 | 2.8 | – | |
| COAL BASIN | 9 | MID-CONTINENT RESOURCES | U.G. | L.W. | 20 | 1.3 | 0.85 | |
| SNOWMASS | 2 | ANSCHUTZ COAL | U.G. | L.W. | 20 | 1.0 | – | 20° - 35° DIP |
| HAWKS NEST E & W. | 4 | WESTERN SLOPE CARBON | U.G. | C.M., SC. (L.W.) | 27 | 1.4 | 0.8 | WASTE DISPOSAL |
| OHIO CREEK No. 2 | 1 | HENRY WEAVER | U.G. | CONV R&P. | 24 | 0.012 | 0.012 | |
| WINDJAMMER No. 1 | 1 | ANCHOR COAL CO | U.G. | C.M | 10 | .12 | – | |
| CAMEO Nos. 1-2 | 1 | GEX COLORADO | U.G. | C.M. | 24 | 1.468 | 0.745 | |

(All tonnages are in $10^6$ units)

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | MINE TYPE | MINING EQUIPMENT | MINE LIFE (YEARS) | MAXIMUM DESIGN CAPACITY | CURRENT OPERATING CAPACITY | NOTES ON MINING OR RECLAMATION CONDITIONS AFFECTING PRODUCTION |
|---|---|---|---|---|---|---|---|---|
| COAL CANYON | 3 | MID-CONTINENT COAL&COKE | U.G. | C.M., L.W., A. | 33 | 0.5 | – | |
| COTTONWOOD CREEK | 3 | MID CONTINENT RESOURCES | U.G. | C.M., L.W. | 30 | 1.0 | – | ROOF CONTROL |
| ROADSIDE | 1 | GEX COLORADO | U.G. | C.M., L.W. | 30 | 1.24 | 0.83 | |
| | 72 | | | | | | | |
| UTAH | | | | | | | | |
| B CANYON | 1 | U.S. STEEL CORP | U.G. | C.M., L.W. | 25 | 1.0 | – | |
| BRAZTAH Nos 3,5,6,7 | 10 | FRANKLIN REAL ESTATE | U.G. | C.M., L.W. | 20 | 6.5 | 1.0 | |
| CANDU NO. 1 | 1 | WASATCH COAL CO | U.G. | C.M. S.C. | 10 | .222 | – | |
| PINNACLE (DEADMAN) | 3 | TOWER RESOURCES, INC. | U.G. | C.M., S.C. | 30 | 1.0 | – | |
| GORDON CREEK NO. 2 | 1 | BEAVER CREEK COAL CO | U.G. | C.M., S.C. | 16 | .522 | 0.5 | |
| SAGE POINT - DUGOUT | 6 | EUREKA ENERGY CO | U.G. | C.M., LW | 40 | 3.2 | – | |
| SOLDIER CANYON | 1 | CALIF. PORTLAND CEMENT | U.G. | Conv., C.L. | 11 | 0.75 | 0.65 | METHANE |
| SUNNYSIDE Nos 1,2,3 | 2 | KAISER STEEL CORP | U.G. | 70%LW. 30%C | 20 | 1.0 | 1.0 | |
| BELINA Nos 1,2 | 3 | KANAWHA - HOCKING | U.G. | C.M., S.C. | 27 | 1.5 | 0.5 | |

(All tonnages are in $10^6$ units)

5-4

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | MINE TYPE | MINING EQUIPMENT | MINE LIFE (YEARS) | MAXIMUM DESIGN CAPACITY | CURRENT OPERATING CAPACITY | NOTES ON MINING OR RECLAMATION CONDITIONS AFFECTING PRODUCTION |
|---|---|---|---|---|---|---|---|---|
| GENEVA | 2 | U.S. Steel Corp | U.G. | C.M., SC. | 7 | 0.67 | 0.25 | |
| O'CONNOR | 1 +(3)* | Valley Camp of Utah | U.G. | C.M. | 10 | 1.3 | – | |
| SKYLINE | 3 +(2)* | Coastal States | U.G. | L.W., C.M. | 35 | 5.4 | – | |
| STAR POINT Nos 1, 2 | 3 | Plateau Mining | U.G. | C.M. SC. | 22 | 1.3 | 1.1 | |
| DES-BEE-DOVE | 3 | Utah Power & Light | U.G. | C.M., S.C. | 13 | 1.343 | 1.3 | |
| EMERY DEEP | 1 | Consolidation Coal | U.G. | Conv, C.M. (L.W) | 14 | 0.6 | – | Caving, Aquifer, Spontaneous Combustion |
| HIAWATHA COMPLEX | 3 | United States Fuel | U.G. | C.M. (L.W) | 35 | 3.0 | 1.0 | |
| HUNTINGTON CANYON 4,5 | 3 | Swisher Coal Co | U.G. | C.M. SC. | 15 | 1.32 | 0.4 | |
| TRAIL MOUNTAIN | 1 | John L. Bell | U.G. | Conv. | 7 | 0.06 | 0.05 | |
| WILBERG - DEER CREEK | 9 | Utah Power & Light | U.G. | L.W., C.M. | 35 | 6.04 | 3.6 | Rib Sloughing, Water |
| ALTON | 28 | Utah Internat'l & HEI. | S | D.L. w S, T.&S. | 22 | 11.0 | – | |
| KAIPAROWITS | 21 | Mono Power, ET. AL. | U.G. | L.W. S.W. C.M. Conv. | 35 | 12.0 | – | |
| RED AND BLUE | 16 | El Paso Energy | U.G. | C.M. S.W. (L.W. S.P. | 38 | 6.8 | – | Subsidence |
| CONVULSION CANYON | 4 | Coastal States Energy | U.G. | Conv, C.M., L.W., S.W. | 22 | 2.1 | 1.8 | |

(All tonnages are in $10^6$ units)

5-5

| LEASE BLOCK MINE NAME | NUMBER OF LEASES | LESSEE | MINE TYPE | MINING EQUIPMENT | MINE LIFE (YEARS) | MAXIMUM DESIGN CAPACITY | CURRENT OPERATING CAPACITY | NOTES ON MINING OR RECLAMATION CONDITIONS AFFECTING PRODUCTION |
|---|---|---|---|---|---|---|---|---|
| SKUMPAH CANYON | 1 | ENERGY RESERVES | U.G. | C.M., CONV. | 45 | 2.0 | - | |
| UTE Nos. 1, 2 | 1 | MOUNTAIN STATES RESOURCES | BOTH | C.M.) D.L., D, F.E.L., T | 22 | 2.7 | - | |
| | 128 | | | | | | | |
| NEW MEXICO | | | | | | | | |
| Mc KINLEY | 4 | GULF OIL CORP | S | D.L., T&S | 33 | 6.0 | 4.6 | |
| STAR LAKE | 1 | THERMAL ENERGY | S | | 35 | 8.0 | - | |
| LA VENTANA | 5 | IDEAL BASIC IND. | U.G. | C.M., S.C. | 35 | 3.0 | -- | SPONTANEOUS COMBUSTION |
| BISTI | 3 | WESTERN COAL CO | S CUT & FILL | D.L., D.W.S., A. T&L, F.E.L. | 34 | 4.3514 | - | |
| LA PLATA | 1 | CIMARRON COAL CO | S | | 10 | 1.0 | - | MINE PLAN NOT FOR PROD. |
| SAN JUAN | 3 | WESTERN COAL CO | BOTH | D.L., F.E.L., T /CM | 35 | 5.5 | 4.0 | |
| | 17 | | | | | | | |
| OKLAHOMA | | | | | | | | |
| BOKOSHE | 2 | GARLAND COAL & MNG | BOTH | D.L., F.E.L., T. CM, BC. | 20 | .28 | .105 | HIGH SODIUM CONTENT IN SOIL |

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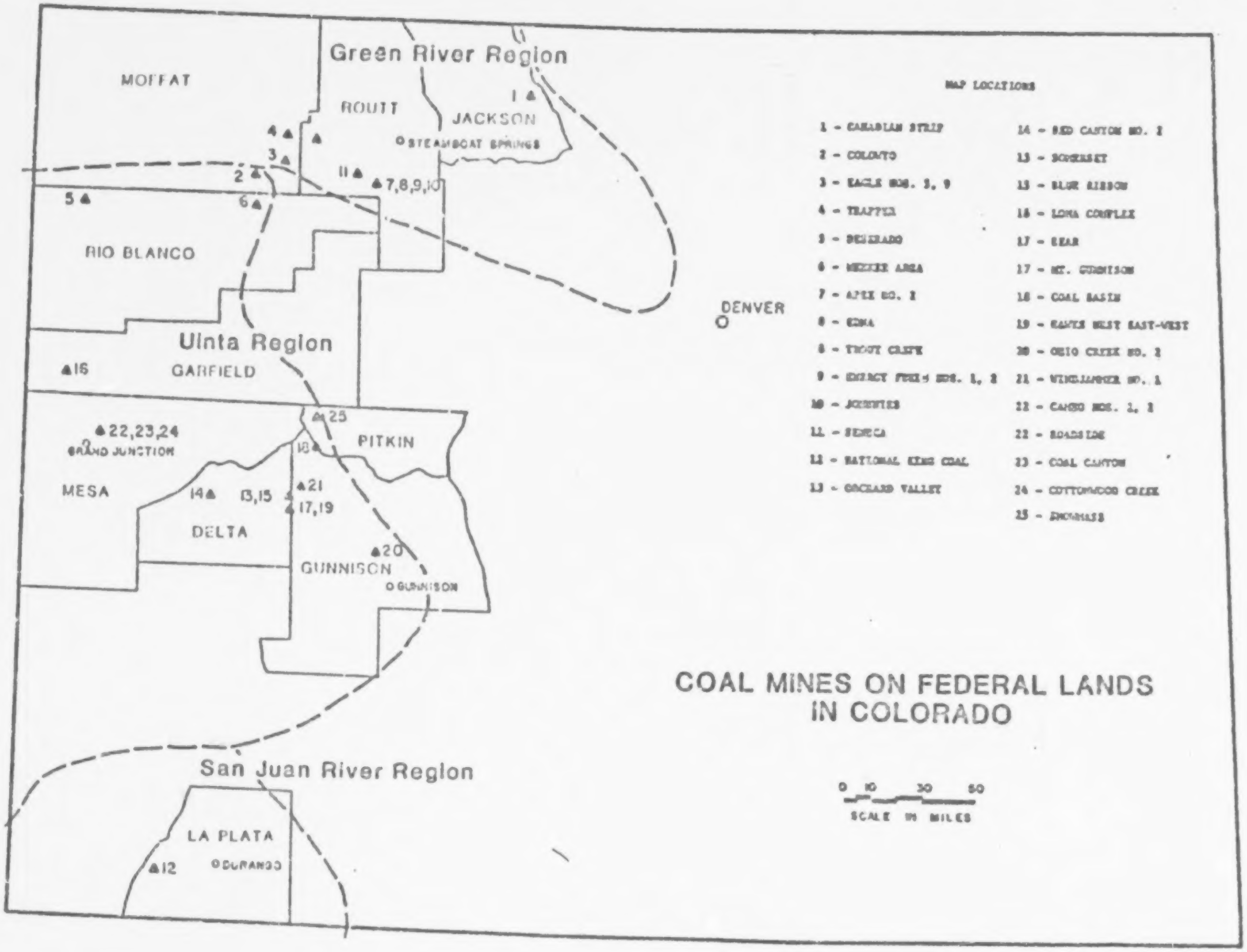
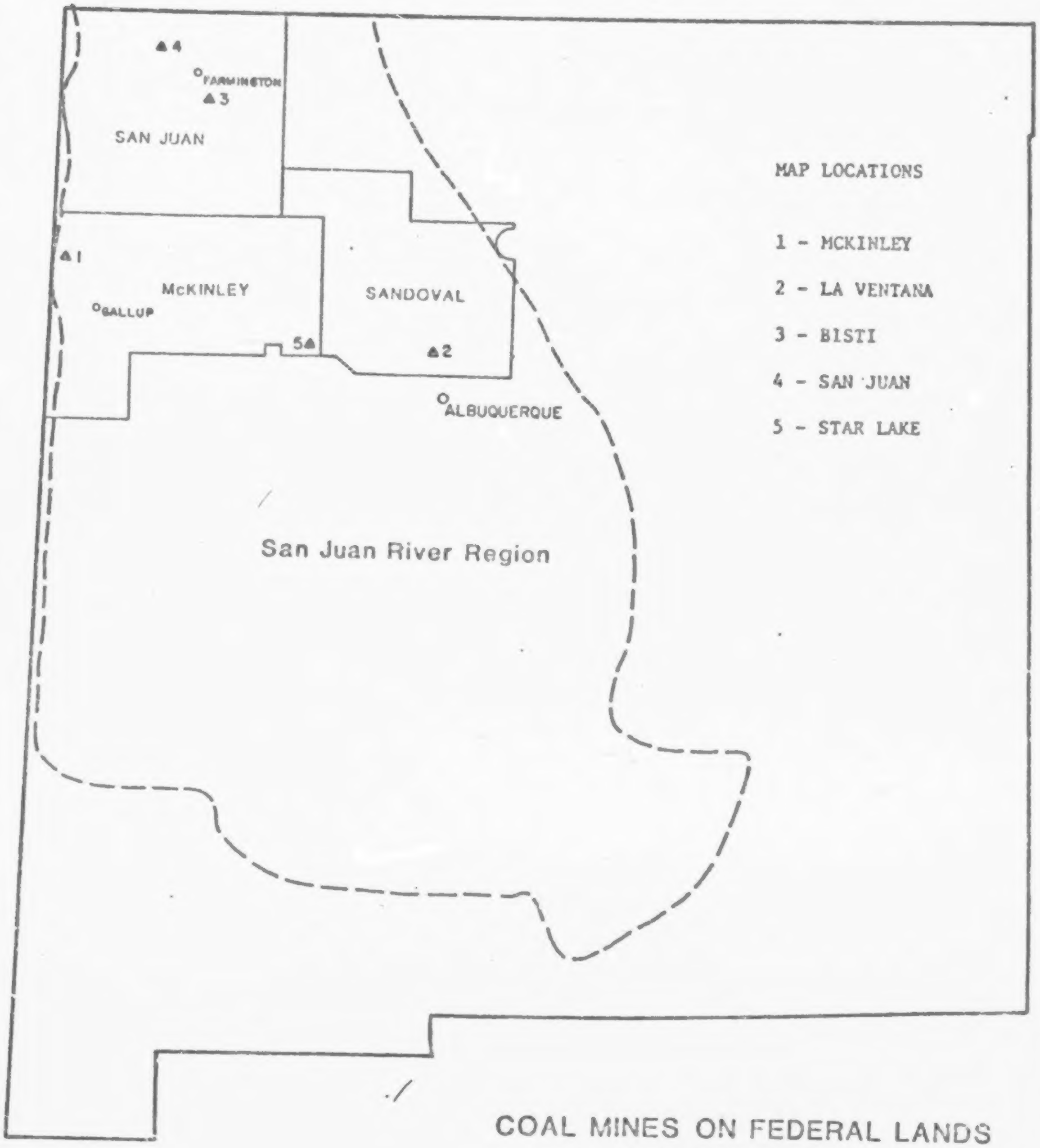
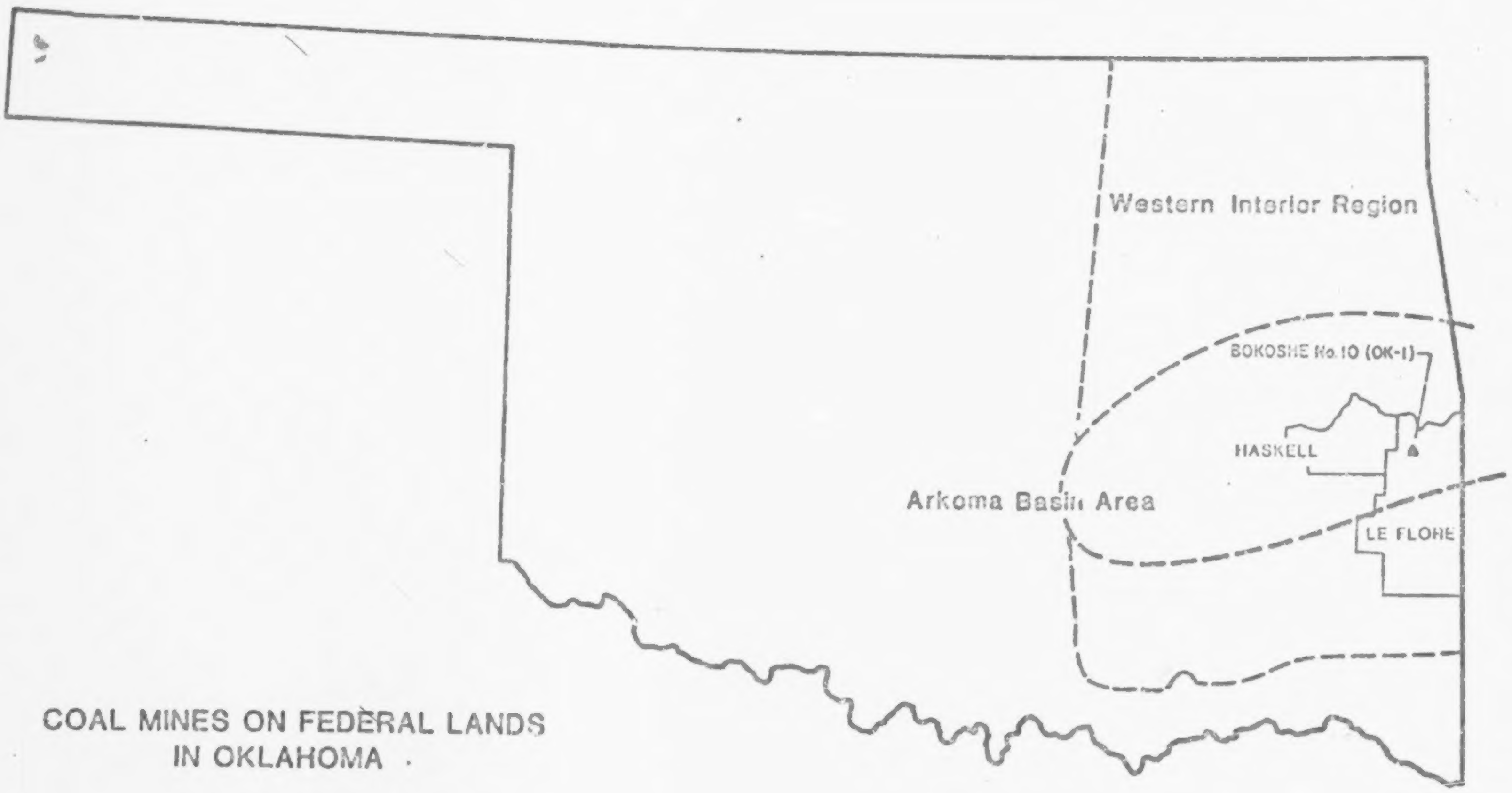


Green River Region
Uinta Region
San Juan River Region
MOFFAT
ROUTT
JACKSON
RIO BLANCO
GARFIELD
MESA
DELTA
PITKIN
GUNNISON
LA PLATA
STEAMBOAT SPRINGS
DENVER
GRAND JUNCTION
GUNNISON
DURANGO
1
2
3
4
5
6
7,8,9,10
11
12
13,15
14
16
17,19
18
20
21
22,23,24
25
MAP LOCATIONS
1 - CANADIAN STRIP
2 - COLOWYO
3 - EAGLE NOS. 5, 9
4 - TRAPPER
5 - DESERADO
6 - MEEKER AREA
7 - APEX NO. 2
8 - EDNA
8 - TROUT CREEK
9 - ENERGY FUELS NOS. 1, 2
10 - JOHNNIES
11 - SENECA
12 - NATIONAL KING COAL
13 - ORCHARD VALLEY
14 - RED CANYON NO. 1
15 - SOMERSET
15 - BLUE RIBBON
16 - LOMA COMPLEX
17 - BEAR
17 - MT. GUNNISON
18 - COAL BASIN
19 - HAWKS NEST EAST-WEST
20 - OHIO CREEK NO. 2
21 - [illegible] NO. 1
22 - CAMEO NOS. 1, 2
22 - ROADSIDE
23 - COAL CANYON
24 - COTTONWOOD CREEK
25 - SNOWMASS
0 10 30 50
SCALE IN MILES

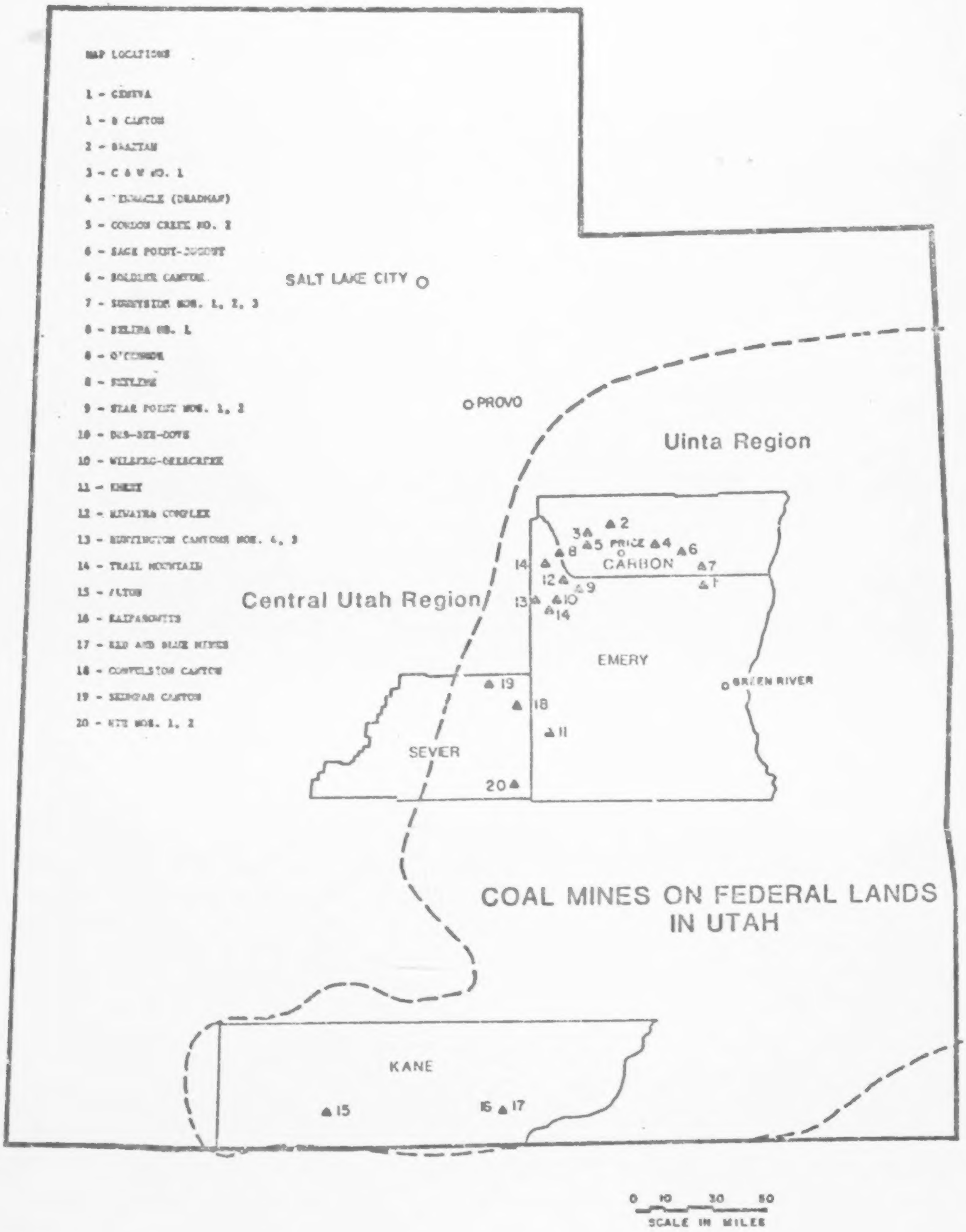
COAL MINES ON FEDERAL LANDS IN COLORADO


▲4
FARMINGTON
▲3
SAN JUAN
▲1
McKINLEY
GALLUP
5▲
SANDOVAL
▲2
ALBUQUERQUE
San Juan River Region
MAP LOCATIONS
1 - MCKINLEY
2 - LA VENTANA
3 - BISTI
4 - SAN JUAN
5 - STAR LAKE
0 10 30 60
SCALE IN MILES

COAL MINES ON FEDERAL LANDS
IN NEW MEXICO


Western Interior Region
BOKOSHE No.10 (OK-1)
HASKELL
Arkoma Basin Area
LE FLORE
0 10 30 50 MILES

COAL MINES ON FEDERAL LANDS
IN OKLAHOMA


MAP LOCATIONS
1 - GENEVA
1 - B CANYON
2 - BRAZTAH
3 - C & W NO. 1
4 - PINNACLE (DEADMAN)
5 - GORDON CREEK NO. 2
6 - SAGE POINT-DUGOUT
6 - SOLDIER CANYON
7 - SUNNYSIDE NOS. 1, 2, 3
8 - BELINA NO. 1
8 - O'CONNOR
8 - SKYLINE
9 - STAR POINT NOS. 1, 2
10 - DES-BEE-DOVE
10 - WILBERG-DEERCREEK
11 - EMERY
12 - HIAWATHA COMPLEX
13 - HUNTINGTON CANYONS NOS. 4, 3
14 - TRAIL MOUNTAIN
15 - ALTON
16 - KAIPAROWITS
17 - RED AND BLUE MINES
18 - CONVULSION CANYON
19 - SKUMPAH CANYON
20 - [illegible] NOS. 1, 2
SALT LAKE CITY
PROVO
Uinta Region
Central Utah Region
PRICE
CARBON
EMERY
GREEN RIVER
SEVER
KANE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
14
15
16
17
18
19
20
0 10 30 50
SCALE IN MILES

COAL MINES ON FEDERAL LANDS IN UTAH